SOFTWARE BUSINESS MANAGEMENT

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SOFTWARE BUSINESS MANAGEMENT

Prepared for:

INTERNATIONAL BUSINESS MACHINES CORPORATION

OCTOBER 1980

SOFTWARE BUSINESS MANAGEMENT

ABSTRACT

This report provides descriptions of the software planning and selection process, the software development process, software marketing and distribution, software support and maintenance and how software fits into the company in general.

Hardware companies (both mainframe and minicomputer firms), turnkey systems suppliers and software companies' practices are described, analyzed and compared.

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I INTRODUCTION

I INTRODUCTION

A. PURPOSE AND SCOPE

- This report was prepared by INPUT as a custom study for IBM Data Processing Division, Commercial Analysis Department, White Plains, New York. The objective of this study is to provide descriptions of:

  - The software planning and selection process.

  - The software development process.

  - Software marketing and distribution.

  - Software support and maintenance.

  - How software fits into the company.

- The composition of the marketplace has been analyzed in terms of:

  - Vendors of large scale hardware systems, such as:

    - Burroughs.
    - Honeywell.
    - Univac.
    - NCR.
    - Control Data Corporation.

  - Vendors of small scale hardware systems, such as:

    - Digital Equipment Corporation.
    - Hewlett-Packard.

- Data General.
- Prime Computer.
- Wang Laboratories.
- Tandem Computer.
- Univac (Varian).
- Honeywell.

- Vendors of intelligent terminal systems, such as:

  - Datapoint.
  - Northern Telecom/Data 100.
  - Nixdorf.
  - Texas Instruments.

- Vendors of turnkey systems, such as:

  - Paradata.
  - Manufacturing Data Systems (MDSI).
  - Reynolds and Reynolds.
  - Turnkey Systems (NCSS).
  - Compusource (EDS).
  - Tymshare.
  - Binary Data.
  - Martin-Marietta Data Systems.
  - Chase Computer Corporation.
  - Keydata.
  - Health Data Systems.

- Independent software vendors, such as:

  - Informatics.
  - Cincom.
  - Management Science America.
  - Applied Data Research.
  - University Computing Company.
  - SDI Associates.

- Cullinane.
- Pansophic.
- MRI Systems.
- Mathematica.
- Software AG.
- Computer Associates.
- The Computer Software Company.
- Turnkey Systems.
- National CSS.
- Computer Sciences Corporation.
- System Development Corporation.

B. METHODOLOGY

- INPUT conducted telephone interviews with 13 companies for this project.
  - Three interviews with vendors of large scale systems.
  - Four interviews with vendors of small systems/intelligent terminal systems.
  - Three interviews with vendors of turnkey systems.
  - Three interviews with independent software and remote computer services vendors.
  - Twenty-three individuals were interviewed.
- The interviews were conducted during August and September 1980 based on a questionnaire jointly developed by IBM and INPUT and approved by IBM.
- Vendors were selected by INPUT from a list submitted by IBM.
- INPUT was identified as a consultant to all vendors. IBM was not identified.

- In those few cases where specific information was stated by the respondent to be proprietary in nature, it has been deleted from any materials delivered to IBM. In one case a respondent gave permission for the information to be included anonymously in the study, and this restriction has been observed.

- Information developed has been tabulated and arrayed or summarized at the direction of IBM, and forms the basis for the other chapters of this study. A presentation of the material on hardware companies was presented orally to IBM staff at White Plains and Armonk on September 15, 1980 and September 23, 1980. Material on turnkey and software companies was presented orally to an IBM staff member at INPUT's office on October 3, 1980. This material constitutes the major portion of this final report.

C. DEFINITIONS

In the course of the interviews, the following definitions were used:

- Type Of Software is divided into the following categories:

  - Operating systems.
  - Compilers/assemblers.
  - Communications.
  - Programming/conversion aids.
  - Sort/merge and other utilities.
  - Data management/query/report generators.
  - Application packages.

- Customer Feedback can be either direct (visits to field by marketing or development staff, user groups or commissioned research) or by indirect means (feedback from sales force and technical support staff, analysis of customer hot line inquires or input from other vendors).

- End Users are customers who will be using the product in the course of their operations. These end users may either be data processing departments or other user departments. OEM's are not considered end users in this study.

- Marketing Approches include:

  - Advertising.

  - Direct mail.

  - Sales calls.

  - Telephone marketing.

  - Seminars.

  - Trade shows.

  - Other.

  - Demonstrations (which could be used in one or more of the above).

- A Turnkey System is hardware and software integrated into a total system designed to completely fulfill the processing requirements of an application for a user.

- Revenues are 1979 worldwide revenues.

NOTE: Quotation marks around words or phrases in company profiles and summaries indicate a direct quotation from a respondent.

II EXECUTIVE SUMMARY

II EXECUTIVE SUMMARY

- This summarizes the main points of software business management practices in hardware (mainframe and minicomputer), turnkey and software companies.

- The information was obtained through a series of telephone interviews with software development and marketing management in August and September 1980.

- The major areas investigated were:

  - The software planning and selection process.

  - The product development process.

  - The marketing and distribution process.

  - Service and support.

  - General organizational issues.

- Software product planning and selection.

  - Virtually all firms describe their planning process in the following terms:

    - The marketing group originates proposals for new products/-enhancements, defines products generally and projects sales.

    - The development group estimates cost and often provides more product detail.

    - Priorities are set jointly.

- Approval for new products come from a committee or general management.

- In hardware firms, these may be a separate planning group or development may take a more active role earlier in the process.

- However, there are usually major exceptions to the planning process:

  - In every hardware firm, operating systems or many applications were exempt from all or major portions of the process.

  - In other firms, the process was subject to a variety of exceptions and was in any event often informal.

- Priority-setting for software development uses ROI and/or a software budget in hardware firms.

  - However, various kinds of marketing factors (customer needs, market share, etc.) are used to modify financial priorities.

  - In general, marketing factors are more important than financial criteria for turnkey and software firms.

- The impression received of the selection process was one that often had considerably less structure in reality than appeared to be the case on initial inspection because of:

  - The informality and evolution of the process in many firms.

  - The numerous exceptions to the process.

  - The importance in most firms of non-quantitative criteria in setting software priorities.

- All firms use one or more kinds of direct contact (visits, hot line, user groups) with customers to receive feedback on products.

  . Most firms also receive feedback via the sales force; a few firms expressed reservations over the usefulness of information obtained from the sales force.

- Hardware firms were virtually unanimous in their belief that the most important change needed in the planning process was better means of identifying end user needs.

  . The needs seen by other types or firms were more varied and included more formal or more market-driven planning as well as several firms which saw no need for changes.

• Software development.

- Hardware firms develop a significant portion of their software in-house.

  . In some cases, they may formally obtain applications software from third parties (which the hardware firm then sells and maintains).

- In other cases, they may encourage third parties to sell and maintain applications software; however, this is done informally.

- All hardware firms utilize a variety of software productivity techniques, using a larger number than the other types of firms.

  . However, with few exceptions, no firm had a means of usefully measuring software productivity or effectiveness.

- About half the firms expressed a desire to increase the automation of software development.

  . This was in spite of the fact that most firms had no more certainty of being able to measure productivity in the future than in the past.

- Other firms wished to achieve a particular goal (e.g. lower costs, higher quality), but were also not sure if their present tools would accomplish this.

- Software marketing.

  - There does not appear to be agreement on what constitutes software marketing. There are several schools of thought on what it is:

    - It is any marketing that goes beyond just selling hardware.

    - It is a fairly tightly packaged set of hardware/software.

    - It is primarily software that is being marketed, with the hardware component assumed or ignored.

    - These attitudes may reflect as much a firm's history (e.g., a strong hardware marketing position) as the present day environment.

  - Few marketing techniques (e.g. sales calls, print advertising seminars, trade shows, etc.) predominate; most firms use a wide variety of techniques. There is a slight tendency to favor seminars and demonstrations as a marketing technique.

  - All firms sell directly to end users, with attention increasingly focused away from a customer's data processing department.

    - Some hardware firms sell software to hardware OEM's or independent software companies, reflecting their traditional practices.

  - New distribution channels for software may be on the horizon, but no firm suggested what these would be, except in very general terms (e.g., reduce distribution costs in order to sell to smaller accounts).

- There is no predominant pricing methodology employed. All approaches are used (cost, value, competition), in many cases in combination (e.g., cost as a floor, value as a ceiling with competition often determining the actual price). Some reservations were expressed as to whether it was actually feasible to quantify these factors.

- The sales force sells all of a firm's products (hardware, software, etc.) and does not specialize in software per se.

  . All firms organize the sales force geographically and in about half the cases also organize it by industry or application. More of the others will probably be moving in this direction as their sales force and/or product line expands.

- All of the hardware firms as well as some of the other firms saw the most important future change in marketing as being an increased focus on the specific needs of end users. There were a variety of other changes foreseen (focus on smaller users, different pricing strategy, etc.) as well as no significant changes foreseen.

• Service and support.

- Most firms place pre and post sales support and field maintenance under marketing, usually reporting to a regional manager.

- Central software support is usually shared between marketing and development, although in some firms development has sole responsibility.

- There are indications that software maintenance may in the future be made a profit center and removed from the direct control of the marketing group.

• General organizational issues.

- Virtually all firms have a software business plan, usually with a five-year horizon.

  - Revenue is the chief criteria, but many firms introduce other factors (e.g., market share, assistance in selling other products, and marketing objectives).

  - These other factors are usually introduced to recognize the enhancing effect of software on a firm's non-software products.

- Where firms are involved with both applications and non-applications software, there is a basic separation between these two parts of their software business.

- Virtually all firms have recently made or are in the process of making organizational changes affecting their software business.

  - Many of the changes are focused on improving the planning process or further integrating software with the rest of the business.

- Future changes.

  - There is great unanimity that software will become increasingly end user application oriented, with specialization by industry. Most firms felt themselves well positioned to take advantage of this trend.

  - Many firms also saw a blurring between hardware and software with increased emphasis on a total package that would make it easier for a user to meet operational requirements.

III COMPANY PROFILES

BURROUGHS (LARGE COMPUTERS)

COMPANY PROFILE

A. REVENUES

- $2.8 billion (published data, entire corporation) - software percentage "close to significant"*.

B. SOFTWARE ORGANIZATION

- OVERVIEW

Function:	PLANNING	DEVELOPMENT	MARKETING	SERVICE
Size:	*	*	*	*
Highest Title:	V.P.	1. Gen'l Mgr.(Appl) 2. Gen'l Mgr.(Op.Sys)	Exec. V.P.	V.P.
Reports To:	Vice Ch	1. Vice Chairman 2. V.P. Grp. Exec.	President	Exec.V.P.(Mkt)

- ORGANIZATION STRUCTURE

  - Organized by product type: Divided between applications and systems software.
  - Coordinated by Senior Executive Product Planning Committee.
  - In 1979 the Program Products Division became responsible for all applications software development.

- BUSINESS PLAN

  - 5 year horizon; revenue is criterion.

C. PRODUCT/PLANNING AND SELECTION PROCESS

- GENERAL PROCESS

  - Corporate planning generates functional product specifications.
  - Program products (in Development) estimates cost to build or buy. Marketing forecasts five year revenues. Corporate Product Management makes recommendations and presents to Senior Executive Product Planning Committee.
  - Exceptions
    - Operating systems are part of hardware product package and are costed in manufacturing.
    - Large investments require approval of Operating Committee.
    - Enhancements aren't subject to same depth of financial analysis.

* Respondent requested that no figures be cited in report.

- PRIORITY SETTING

  - "Basically" ROI, however, also influenced by extent to which "total solution" philosophy is supported.
  - Some enhancements may not be judged solely on ROI if, for example, customer satisfaction is involved.

- CUSTOMER FEEDBACK

  - Hot line (best); sales force, tech support staff; user groups.

- CHANGES

  - Need seen for better market research so that software can be better defined to meet customers needs.

D. PRODUCT DEVELOPMENT

- ORGANIZATION AND CONTROL

  - Application Development Centers specialize by major product areas (across machine lines).
  - Project groups within Development Centers are organized by product.
  - Operating systems development organized by machine.
  - PERT is control mechanism, but usage varies.

- PRODUCTIVITY

  - Use structured design and design standards.
  - Internal software generation tools are also offered as products.
  - COBOL used for most applications.
  - Trying to establish product standards to judge software adequacy.

- CHANGES

  - Development costs should be reduced; "may be just a hope".

E. MARKETING/DISTRIBUTION

- ORGANIZATION AND APPROACHES

  - Sales force sells both hardware and software on commission. (Formerly, there were software specialists)
  - Organized geographically, with industry specialists.
  - Software sold to end users only using all types of marketing approaches; seminars and demonstrations stressed - also use mobile sales units.
  - Under 100 products are offered, due to method of counting (e.g. 9 application products explode to over 100 in price list).
  - Products are priced using cost and competitive situation; hardware and software are often bundled.

- COMPETITION

  - Burroughs does not oppose any vendor offering Burroughs-compatible software, since it will help sell hardware.
  - Vendors offering applications where Burroughs doesn't will be actively supported.

- CHANGES

  - Marketing of hardware and software will be increasingly hard to separate. Burroughs will be offering more "total solution" packages.

F. SERVICE/SUPPORT

- All software maintenance (Field Engineering) and technical sales and support are under Marketing.

- Many service/support personnel specialize by type of product or application.

- Marketing provides central support to the field and coordinates with Development (maintenance).

G. OVERALL TRENDS IN SOFTWARE INDUSTRY AND IMPACT ON YOUR FIRM

- More "solution-oriented" industry applications will be offered by all firms.

HONEYWELL (LARGE COMPUTERS)

COMPANY PROFILE

A. REVENUES

- $500 million (large computers).

B. SOFTWARE ORGANIZATION

- OVERVIEW

Function:	PLANNING*	DEVELOPMENT	MARKETING*	SERVICE*
Size:	100-150	700	4,800**	4,100 (F.E.)
Highest Title:	Manager	Director	Area VP	1. VP-F.E. 2. Sr. Analyst
Reports To:	Gen'l Mgr.	Ass't Gen'l Mgr.	Gen'l Mgr.	1. Gen'l Mgr. 2. Branch Mgr.

- ORGANIZATION STRUCTURE

  - Organized by product type: Operating systems, end user facilities, applications.
  - Coordinated by task forces from major areas; also, marketing planning works with corporate planning.
  - The U.S. marketing organization is now in the process of being restructured.

- BUSINESS PLAN

  - 5-10 year horizon; criteria are software revenue plus "pull-through" assistance in selling other products.

C. PRODUCT/PLANNING AND SELECTION PROCESS

- GENERAL PROCESS

  - Corporate Planning division draws up product specifications based on market requirements and competitive analysis from Marketing. Development evaluates cost and technical feasibility. A business analysis is made by a task force from Development, Planning and Marketing. General Manager (large computers) makes final decision.
  - Exceptions
    - Operating systems are often developed based on internal needs and initiated by Development.
    - Applications are usually developed on an as-needed basis.

* Includes both hardware and software.
** U.S. sales and sales technical support.

HONEYWELL (LARGE COMPUTERS) - continued

- PRIORITY SETTING

  - There is an overall software budget, with a fixed portion for maintenance.

- CUSTOMER FEEDBACK

  - User groups; in-depth interviews and meetings with local customers; field sales input; commissioned research from outside firms.

- CHANGES

  - No changes are expected because firm is "comfortable" with the present process, but also because it is difficult to change the process in such a large organization.

D. PRODUCT DEVELOPMENT

- ORGANIZATION AND CONTROL

  - Technical staff are organized into a "software factory". About 550 are programmer analysts responsible for all new products enhancements, maintenance, pre-release support, and documentation.
  - The company-wide "step-review" planning and control process is integrated into Development project control.

- PRODUCTIVITY

  - There is extensive use of design methodologies and design languages.
  - Each person will have a terminal in building now being constructed.
  - Thirty measurements are used to track performance.

- CHANGES

  - Honeywell's aim is to make the development process a "business-like engineering function".

E. MARKETING/DISTRIBUTION

- ORGANIZATION AND APPROACHES
  - 4800 sales and sales support staff sell hardware and software.
  - Sales force is organized geographically, with some specialization by application.
  - Software usually only sold through direct sales calls to end users (as part of a hardware sale).
  - An estimated 500+ products are offered (one product equals one line on price list).
  - Products are priced according to value to customers.

- COMPETITION
  - No software competition, per se, since little software is offered by third parties for Honeywell hardware.
  - IBM, Univac and Burroughs are competitors for hardware/software package sales.

- CHANGES
  - Must increase sales force productivity (sales per person). It is not yet clear to them how this will be accomplished.

F. SERVICE/SUPPORT

- Pre and post sales support is provided by "systems analysts" under Marketing.
- Software maintenance is responsibility of Field Engineering organization (not under Marketing).
- There are senior generalists who are supported by product/application specialists.
- Field Engineering provide central support and interfaces with Development (maintenance).

G. OVERALL TRENDS IN SOFTWARE INDUSTRY AND IMPACT ON YOUR FIRM

- Industry - specific applications will become increasingly important.

SPERRY-UNIVAC (MAINFRAMES)

COMPANY PROFILE

A. REVENUES

- $2,319 million (software percentage proprietary; NOTE: Software was bundled until 1979).

B. SOFTWARE ORGANIZATION

- OVERVIEW

Function:	PLANNING	DEVELOPMENT	MARKETING	SERVICE
Size:	Prop.*	Prop.*	Prop.*	Prop.*
Highest Title:	Dir.	Dir.	Pres.(Div)	Mgr.
Reports To:	V.P.	V.P.	Pres.	Br.Mgr.

- ORGANIZATION STRUCTURE

  - Organized by product type: Divided between applications and systems software.
  - Coordinated by Business Plan and planning process.
  - For past five years have been moving applications development into Marketing.

- BUSINESS PLAN

  - Five year horizon - use financial targets for established products (cost, revenue, profitability); market-based targets for new products (market share, importance to target industry penetration).

C. PRODUCT PLANNING AND SELECTION PROCESS

- GENERAL PROCESS

  - Three phased approach (established in 1980); marketing responsible.
    1. "Product Opportunity Report", brief overview of product and markets. Vice President decides whether to go ahead.
    2. Formal, in-depth study of product features, market appraisal, cost estimation and financial analysis.
       . All performed in Marketing.
       . Other divisions respond to proposal.
       . Need 6-8 approvals, including President (Marketing).
    3. Pre-announcement approval, which is a reconfirmation of step 2, above; requires President's approval.

* Proprietary.

- Exceptions
  - Non-application products are selected by the Product division; there is no management level coordination.
  - Entering a new industry area involves a less formal and quantitative process.

- PRIORITY SETTING
  - Financial (5 year plan and budget) criteria for established products.
  - Marketing share for new products or some target industries.

- CUSTOMER FEEDBACK
  - User groups.
  - Sales force.

- CHANGES
  - No changes foreseen since current process was just introduced. Replaced less formal process that was perceived not to be supporting target industry penetration effectively.

D. PRODUCT DEVELOPMENT

- ORGANIZATION AND CONTROL
  - Five industry (application) Development Groups specialize in one or more target industries.
  - Project teams within groups focussing on functional areas.
  - Operating system development organized by machine.
  - Manual scheduling methods used.

- PRODUCTIVITY
  - Structured design.
  - Design and code reviews.
  - Number of errors and number of technical questions from field used to measure performance.

- CHANGES
  - Will continue to centralize applications development in marketing.

E. MARKETING/DISTRIBUTION

- ORGANIZATION AND APPROACHES

  - Sales force sells all DP services/ hardware, software, timesharing, consulting and turnkey systems (minis).
  - Until 1979 all software was bundled; operating systems still bundled. Sales force often still treats software as bundled ("throws it into a hardware sale").
  - Sales force is organized geographically and by industry (branch size permitting).
  - Software sold to end users only, using all types of marketing approaches except telemarketing.
  - Several hundred products are offered, within eight industry areas.
  - Products are priced using value to customers and the competitive situation (operating systems are still bundled.)

- COMPETITION

  - "Hardware vendors and systems houses" offering competitive hardware/software packages to industries.

- CHANGES

  - Unbundling shows increased emphasis on selling software (especially applications software) to make up for falling hardware prices.

F. SERVICE/SUPPORT

- All software maintenance and technical sales and support are under Marketing.

- Informal specialization by industry (depends on orientation of sales force).

G. OVERALL TRENDS IN SOFTWARE INDUSTRY AND IMPACT ON YOUR FIRM

- More "industry-oriented applications software".

WANG

COMPANY PROFILE

A. REVENUES

- $322 million (published data); software percentage unavailable.*

B. SOFTWARE ORGANIZATION

- OVERVIEW

Function:	PLANNING	DEVELOPMENT	MARKETING	SERVICE
Size:	*	*	*	*
Highest Title:	Dir.	Pres.	Exec.V.P.	Area Mgr.
Reports To:	V.P.	-	Pres.	Area Mgr(Sales)

- ORGANIZATION STRUCTURE
  - Organized by machine and product type: Application products (developed and sold by third parties); non-application products (developed in-house and sold by own sales force) include operating systems, compilers, utilities, and data management products.
  - Major coordination performed by President; there are also hardware/-software task forces.

- BUSINESS PLAN
  - Would not respond. (Note: Operating systems are bundled and applications developed and sold by third parties.)

C. PRODUCT/PLANNING AND SELECTION PROCESS

- GENERAL PROCESS
  - Non-application products:
    - Marketing supplies data regarding customer needs and general product specifications.
    - Development groups provide detailed specification and costs. President, who is head of the Development Center, makes final decision.
  - Application products: Entire process carried out locally. There is no corporate approach, although Corporate Marketing findings will be passed on to local sales offices.
  - Exceptions.
    - Not applicable, since normal process is a "dynamic" one.

* Firm views all quantitative data as proprietary.

- PRIORITY SETTING

  - Goals for in-house developed products is to "leverage" existing products and "keep product line going". Priorities are not established for application products since resources are supplied by third parties.

- CUSTOMER FEEDBACK

  - Sales force, user groups, surveys.

- CHANGES

  - Corporate headquarters will become more involved in defining application product needs. This is due to software becoming "hyper-segmented" by market.

D. PRODUCT DEVELOPMENT

- ORGANIZATION AND CONTROL

  - The development center is organized into three groups (each headed by a Vice President) responsible for software for word processors, 2200 series and the VS series.
  - Applications software is developed by third parties. No control is excercised over outside development; however, third parties can be dropped from Wang's application directory if software or support is unsatisfactory.

- PRODUCTIVITY

  - No response.

- CHANGES

  - No changes foreseen.

E. MARKETING/DISTRIBUTION

- ORGANIZATION AND APPROACHES

  - Sales force sells hardware and non-application software to end users (6% of systems go to OEM's).
  - Sales force is organized geographically, with some specialization by machine (although "distinctions becoming blurred" between specialty areas).
  - Software sold as part of hardware sales call.
  - Sales force provides leads to third party suppliers of applications.
  - There are "hundreds" of non-application software products; firm has "no idea" of the number of application products offered by third parties.
  - Product pricing methodology was not available.

- COMPETITION

  - DG and DEC in software/hardware.

- CHANGES

  - No changes foreseen.

F. SERVICE/SUPPORT

- All field software maintenance and sales support staff is under Marketing.
- Technical staff specializes by type of hardware.
- Marketing provides central support and coordinates with Development.

G. OVERALL TRENDS IN SOFTWARE INDUSTRY AND IMPACT ON YOUR FIRM

- Software will become more industry focused.

HEWLETT-PACKARD

COMPANY PROFILE

A. REVENUES

- $203 million - software percentage proprietary.

B. SOFTWARE ORGANIZATION

- OVERVIEW

Function:	PLANNING	DEVELOPMENT	MARKETING	SERVICE
Size:	5	300(est)	N/A	N/A
Highest Title:	1. Prod.Mgr. 2. Plan.Mgr	Div.Mgr.	Div.Mgr	1. S.E. Mgr. 2. Mkt.Supp.Mgr.
Reports To:	1. Div.Mgr.(Mkt) 2. Div.Mgr.(Dev.)	Gen'l Mgr.	Gen'l Mgr.	1. Reg.Sales Mgr. 2. Div.Mgr.

- ORGANIZATION STRUCTURE

  - Organized by product type: Operating systems, compilers, end user products, industry applications.
  - Coordinated by R&D council, marketing council, product teams, ad hoc groups.
  - In August 1980, software for the first time became a separate unit (within the newly-formed Business Computer Group).

- BUSINESS PLAN

  - Up to a 5 year horizon; criteria are revenue for priced products and "internal OEM sales" for bundled operating systems.

C. PRODUCT/PLANNING AND SELECTION PROCESS

- GENERAL PROCESS

  - The process is still in a state of evolution gradually shifting away from a technology-driven mode. Marketing defines needs for enhancements to existing products. Development looks at technological opportunities over a 3-5 year horizon; its input is very important for non-application software. Development estimates costs. Product manager (Marketing) estimates price/volume and ROI. Marketing and Development "always" reach a consensus on products to be developed. There is a great reliance on coordination mechanisms to achieve this consensus.
  - Exceptions.
    - Due to evolutionary process, exceptions do not really exist.

- PRIORITY SETTING

  - Priorities are set based on ROI, technological "leaps", software budget, user needs. Priorities used depend on the product involved. The importance of user needs is increasing. Process for resolving priority conflicts part of consensus process.

- CUSTOMER FEEDBACK

  - Visits to major accounts (best), user groups.

- CHANGES

  - Increasing importance to H-P of being market-driven will be shown in new organization and communication initiatives. Current reorganization will be further refined.

D. PRODUCT DEVELOPMENT

- ORGANIZATION AND CONTROL

  - Three hundred technical staff are organized into 10-15 groups related to major product types or subfunctions. Major groups are divided into autonomous teams of 5-10 people; teams generally handle all aspects of a product (new products, enhancements, maintenance).
  - Use MBO-type milestones set by teams.

- PRODUCTIVITY

  - Have access to many tools (structured languages, testing tools, walk-throughs), but general processes are more important:
    - Each team's commitment to quality by setting own standards.
    - "Quality circles", quality-oriented functions within the project team.

- CHANGES

  - Increasing stress on product quality as an aspect of corporate philosophy.

E. MARKETING/DISTRIBUTION

- ORGANIZATION AND APPROACHES

  - Sales force sells hardware and software; may sell turnkey systems in future.
  - Sales force organized geographically, with some specialization between commercial and technical systems.
  - Software sold to end users and OEM's; future plans include selling through systems integrators and distributors.
  - H-P could not give meaningful estimates for number of products. Published sources indicate under 50 major products are offered (one product equals more than one line on price list).
  - Products are priced according to cost, value to customer and competition.

- COMPETITION

  - IBM is main competition.
  - Wang and Prime are increasingly competitive.

- CHANGES

  - Marketing must be more "solution-oriented". Problem is firm's traditions versus President's desire for new direction.

F. SERVICE/SUPPORT

- All software maintenance (SE's) and pre and post field sales technical support is under Regional Sales Managers.

- Technical support staff does not specialize.

- Marketing provides central support and coordinates with development for maintenance.

G. OVERALL TRENDS IN SOFTWARE INDUSTRY AND IMPACT ON YOUR FIRM

- Software will be usable even by those unfamiliar with computers ("like using the telephone").

UNIVAC (MINICOMPUTER OPERATIONS)
FORMERLY VARIAN

COMPANY PROFILE

A. REVENUES

- $120 million; software is 5% of total.

B. SOFTWARE ORGANIZATION

- OVERVIEW

Function:	PLANNING	DEVELOPMENT	MARKETING	SERVICE
Size:	N/A	160	115*	60*
Highest Title:	V.P.(Corp)	Dir.	V.P.	Reg.Mgr.
Reports To:	V.P./Gen'l Mgr.	V.P. (Corp)	V.P.(Corp)	Reg.Sales Mgr.

- ORGANIZATION STRUCTURE

  - Organized by product type: Application products under Marketing; non-applications under Development.
  - Coordination ad hoc; functions do not meet organizationally until corporate headquarters.
  - Continuing reorganizations since Univac acquired in 1978.

- BUSINESS PLAN

  - Part of corporate plan; five year horizon.

C. PRODUCT/PLANNING AND SELECTION PROCESS

- GENERAL PROCESS

  - Marketing generates a "requirements statement" develops priorities, assigns a budget, and produces a general product specification. Development produces a detailed product description. If Development does not concur with a product proposal, proposal is sent back to Marketing; cycle may repeat several times. Process may take 18 to 24 months between field request and product readiness.
  - Exceptions.
    - Development may generate a "Requirements Statement".
    - Development may initiate programming aids for internal use and then see if salable.
    - Much application development takes place with third parties, by passing much of process.

* Applies to both hardware and software.

- PRIORITY SETTING

  - Priorities are set based on ROI and customer needs.
  - Development may revise scheduling priorities.

- CUSTOMER FEEDBACK

  - Field visits, salesforce.

- CHANGES

  - Must select and produce products that meet customer needs better. This will be accomplished through more correct product definitions, enhancements to current products to improve quality. All may be difficult to achieve given firm's size and organizational environment.

D. PRODUCT DEVELOPMENT

- ORGANIZATION AND CONTROL

  - One hundred and sixty in-house technical staff are organized into Development (70), Field Support (65), Quality Assurance (15) and Publications (10). Development and field support organized by product.
  - Rely on manual PERT for project control.

- PRODUCTIVITY

  - Use structured walk-throughs and peer review.
  - Terminal for each programmer and on-line documentation.
  - Introducing PASCAL.
  - No methodology exists for measuring quality.

- CHANGES

  - In process of implementing high level languages and cross compilers for decreased costs and faster development.

E. MARKETING/DISTRIBUTION

- ORGANIZATION AND APPROACHES

  - 115 salesmen sell mini hardware, software and turnkey systems. The Univac mainframe sales force also sells mini systems.
  - The mini sales force is organized geographically.
  - Software is sold to end users, using all marketing approaches; software is also sold in joint ventures with OEM's and systems integrators.
  - Approximately 60 software products are offered by Univac (one product is more than one line on price list); additional application products are produced by joint ventures.
  - Products priced according to value (but result is "inscrutable")

- COMPETITION

  - Do not see competition in terms of software alone, but for hardware/-software package.
  - DEC and Data General are main competitors for OEM sales.
  - DEC and Prime are main competitors for end users sales.

- CHANGES

  - Increasing focus on end user sales; software critical for reaching this market.

F. SERVICE/SUPPORT

- All software maintenance and technical sales and support technicians are under Regional Sales Managers.

- Univac technical specialists assist in identifying applications from third parties.

G. OVERALL TRENDS IN SOFTWARE INDUSTRY AND IMPACT ON YOUR FIRM

- There will be increasing attention to the needs of end user.

COMPANY NUMBER 6

COMPANY PROFILE

A. REVENUES

- Approximately $250 million (published data); software percentage not applicable since no software charged for by firm.*

B. SOFTWARE ORGANIZATION

- OVERVIEW

Function:	PLANNING	DEVELOPMENT	MARKETING	SERVICE
Size:	*	*	*	*
Highest Title:	1. Dir.(Dev) 2. Dir. (Mkt) 3. Dir. (Corp)	Dir.	VP/Gen'l Mgr.	VP/Gen'l Mgr.
Reports To:	1. VP/Gen'l Mgr 2. VP/Gen'l Mgr. 3. Exec. VP	VP/Gen'l Mgr.	Exec.VP	Exec.VP

- ORGANIZATION STRUCTURE

  - Organized by product type: Application products (developed by third parties) and non-application products (developed in-house).
  - Coordination through Product Management (Development), Product Marketing (Marketing) and Corporate Planning. (Corporate, Marketing and Development have overlapping planning functions.)
  - Significant reorganization of Development and Marketing in early 1980 to attempt to cope with growth. Planning function still remains to be rationalized in 1981.

- BUSINESS PLAN

  - None, since firm receives no revenue from software. Have a 1, 2 and 5 year software strategy with functional and market goals.

C. PRODUCT/PLANNING AND SELECTION PROCESS

- GENERAL PROCESS

  - Process is still evolving. Marketing evaluates ideas from customers and Development. Development estimates costs. Marketing identifies functionality, market size and revenues, competitive position, and costs. Product must be approved by all units involved (units may vary depending on the type of product). Final approval by Executive Vice President.

* Respondent considered all quantitative data proprietary.

- Exception
  - Major exception is applications software which is developed by outside firms. Sales force plays secondary role and there is no central direction.

- PRIORITY SETTING
  - ROI, 5 year software strategy and marketing strategy.

- CUSTOMER FEEDBACK
  - Direct from customers, sales force.

- CHANGES
  - Better means should be developed to define needs and specify products. At present products often do not meet needs because of internal communication breakdowns.

D. PRODUCT DEVELOPMENT

- ORGANIZATION AND CONTROL
  - "Quasi-matrix" organization for in-house development with major functional groups (operating systems, languages and communications) broken down into task-oriented teams. Program Management co-ordinates across these functional lines.
  - Use manual PERT system for in-house development (doesn't work very well).
  - No central control over outside application development; that is done locally.

- PRODUCTIVITY
  - Use walk-throughs, high level languages, some structured design.
  - At least one small computer per programmer.

- CHANGES
  - Working on design and development tools to enable Development to construct prototype systems so that user needs can be met.

E. MARKETING/DISTRIBUTION

- ORGANIZATION AND APPROACHES

  - Sales force sells hardware - applications software purchased from third parties and non-applications software is bundled.
  - Sales force organized geographically.
  - Software for end user is added to hardware in the course of a sales call. (For applications software there will be a referral to a third party).
  - Software also distributed by OEM's, systems integrators and distributors.
  - Firm offers approximately 60 in-house developed products; there is a "big" directory of externally-developed applications.

- COMPETITION

  - Proprietary.

- CHANGES

  - There should be a major organizational realignment to put all Product Planning functions in one location. Development believes these functions belong in Development.

F. SERVICE/SUPPORT

- All field maintenance and pre and post sales support is under marketing.
- Technical support staff specializes by product type (for in-house products).
- Development provides central support for field staff.

G. OVERALL TRENDS IN SOFTWARE INDUSTRY AND IMPACT ON YOUR FIRM

- Increasing importance and acceptance of independent software vendors.
- Extensive use of data base management and on-line systems.
- Shift toward very high level languages and/or query languages (to cut costs and serve customers better).

ELECTRONIC DATA SYSTEMS
(TURNKEY SYSTEMS DIVISION)

COMPANY PROFILE

A. REVENUES

- $10 million (1979); turnkey systems software percentage not available, INPUT's estimate is 33%.

B. SOFTWARE ORGANIZATION

- OVERVIEW

Function:	PLANNING	DEVELOPMENT	MARKETING	SERVICE
Size:	0	Not Avail.	100	50
Highest Title:	-	V.P.	V.P.	Dir.
Reports To:	-	Pres.	Pres	V.P.(Tech)

- ORGANIZATION STRUCTURE

  - The 1979 acquisition of Compusource has been the basis of the Turnkey Systems Division.
  - Organized functionally: formerly organized by seven products, with P&L responsibility but was impractical because Marketing wasn't also organized by product.
  - Coordination achieved by vice president's for Marketing and Development working closely together.

- BUSINESS PLAN

  - Three separate plans for Branch (small) accounts, National (large) accounts and OEM software sales. One year horizon.
  - Criteria used are revenue, market share and number of systems.

C. PRODUCT PLANNING AND SELECTION PROCESS

- GENERAL PROCESS

  - Quite informal and largely "reactive".
  - Marketing receives feedback and requirements for enhancements (so far, little work on new products has been done); defines products, projects sales.
  - Informal "sorting' process between Marketing and Development departments; they set priorities and President approves.
  - Almost always procure new products from third parties and modify in-house; after modifications, fully supported by EDS.

- PRIORITY SETTING

  - Customer needs, most important.
  - ROI becomes important for large investments.

- CUSTOMER FEEDBACK

  - Minicomputer vendors (important).
  - Sales force, market research, customer visits.

- CHANGES

  - Hope to do more planning in a more formalized way; important for entering new markets.

D. PRODUCT DEVELOPMENT

- ORGANIZATION AND CONTROL

  - Mainly an enhancement/maintenance operation.
  - Organized by hardware type (DEC, Datapoint, Data General, Texas Instruments, and IBM Series 1). Formerly supported "any hardware customer wanted", but this was impractical (top management would have wanted only 2-3 vendors).
  - Within hardware groups, organized by product.
  - Use manual, largely reactive control systems.

- PRODUCTIVITY

  - No productivity tools found useful in a multi-vendor maintenance environment.

- CHANGES

  - When more experienced, may develop more software in-house.
  - Hardware improvements may result in more portable and maintainable software.

E. MARKETING/DISTRIBUTION

- ORGANIZATION AND APPROACHES

  - Fifty sales personnel sell turnkey systems to end users (non-DP departments); relatively small number of sales to OEM's.
  - Sales force is organized geographically, although certain large national accounts are handled centrally.
  - All marketing approaches are used, with demonstrations important.
  - Seven major lines of products are offered (wholesalers, manufacturing, etc.) with about 50 separately salable product modules.
  - Pricing is set to be competitive.

- COMPETITION

  - IBM is most important; firms like Basic Four are next.
  - Minicomputer manufacturers are not major competitors now, but will be later.

- CHANGES

  - Nothing significant in the short run.
  - However, there will be many changes as the minicomputer manufacturers opens up market to smaller businesses by lower hardware prices; will then need different distribution channels.

F. SERVICE/SUPPORT

- Pre and post sales support and maintenance is under a Branch Manager of technical support.

- Branch manager reports to a Director in Development.

- Specialize by machine and product.

G. OVERALL TRENDS IN SOFTWARE INDUSTRY AND IMPACT ON YOUR FIRM

- More direct sales to smaller business via distributed processing.

KEYDATA

COMPANY PROFILE

A. REVENUES

- $16 million total; $2.5 million from turnkey systems - expect 100% turnkey growth rate this year; software percentage estimated by firm to be 35% -40%.

B. SOFTWARE ORGANIZATION

- OVERVIEW

Function:	PLANNING	DEVELOPMENT	MARKETING	SERVICE
Size:	0	1. 20+ 2. 6	45	45
Highest Title:	-	1. Dev-V.P. 2. Mkt-Mgr.	V.P.	Sys.Mgr.
Reports To:		1. Pres. 2. Dir.(Mkt.)	Pres.	Reg.Mgr.

- ORGANIZATION STRUCTURE

  - Organized by product type only in Marketing Planning.
  - Coordinated by a "Standards Committee" with representatives from Development, Quality Control, Marketing, Training, Field Service.
  - In the near future will probably move programming section in Marketing to Development.

- BUSINESS PLAN

  - Five year horizon overall: One year for individual vertical markets.
  - Market share is primary criterion, from that number of systems and revenue is derived.

C. PRODUCT PLANNING AND SELECTION PROCESS

- GENERAL PROCESS

  - Process in general is not very formal.
  - For new products (defined as entering a new SIC code) ideas from existing product characteristics, outside sources, migrating on-line customers and market penetration analyses.
  - For enhancements, ideas come from current customers, migrating on-line customers and trade association meetings.
  - Marketing organizes these ideas into product proposals and projects sales. Development and Marketing estimate costs. The standards committee evaluates options.
  - Exceptions
    - Non-application product ideas are generated internally but otherwise same process.

- PRIORITY SETTING
  - Whether new product or enhancement (priority varies).
  - Customer needs primary; financial factors (cost, pricing) secondary.
- CUSTOMER FEEDBACK
  - Meetings with customers.
  - Field maintenance staff.
  - User group (now minor - only have one group in 18 markets).
- CHANGES
  - Will examine proposed enhancements more critically; in past many changes were made whose value was not apparent.

D. PRODUCT DEVELOPMENT

- ORGANIZATION AND CONTROL
  - Mainly an enhancement/maintenance operation of acquired products.
  - Not organized by product type, but react to outside requirements for particular jobs.
  - Control by manual scheduling, usually externally imposed.
- PRODUCTIVITY
  - No productivity aids found feasible in a maintenance environment.
  - Staff lacks capability generally and has a high turnover.
- CHANGES
  - Strongly considering having a significant amount of enhancement/-maintenance work done by third parties. Issue: Quality versus Control.

E. MARKETING/DISTRIBUTION

- ORGANIZATION AND APPROACHES

  - Twenty-five sales personnel sell turnkey and remote computer services to end users (non-DP departments).
  - Sales force is organized geographically and uses all marketing approaches, with demonstrations very important.
  - Sales force commissions range from a junior sales person's 33% (if at 100% of quota) to a senior sales person's 85% (if at 140% of quota.)
  - Products are priced competitively; if no competition, priced according to value to customer.

- COMPETITION

  - In every industry there are other industry specialist turnkey firms.
  - Across the board competition is Basic Four, Microdata and Quantel.

- CHANGES

  - Will probably itemize pricing into hardware, software and maintenance.
  - Reason: Find it too time-consuming to explain bundled pricing structure to unsophisticated users.

F. SERVICE/SUPPORT

- Fifteen pre and post sales support personnel and 30 S.E's ("System Designers") report to a systems manager (who reports to a regional manager.)

- Support staff does not specialize by product.

- Marketing has its own six person programming staff for rush projects.

- Marketing and Development programmers coordinate informally.

G. OVERALL TRENDS IN SOFTWARE INDUSTRY AND IMPACT ON YOUR FIRM

- Will be trying to reduce dependence on programmers by increased use of program development aids and outside application packages.

REYNOLDS AND REYNOLDS
(AUTO DEALER TURNKEY SYSTEMS)

COMPANY PROFILE

A. REVENUES

- $181 million total; $102 million computer system revenue; $38 million in turnkey revenues. Auto dealer computer system revenues were $11 million. Software percentage unavailable, estimated by INPUT to be 33%.

B. SOFTWARE ORGANIZATION (Automotive Division as example)

- OVERVIEW

Function:	PLANNING	DEVELOPMENT	MARKETING	SERVICE
Size:	0	125	210	375
Highest Title:	-	Dir.	V.P.	Dir.
Reports To:		V.P.	Sr.V.P.	V.P.(Mkt.)

- ORGANIZATION STRUCTURE

  - Entire company is divided into four very autonomous divisions.
    1. Auto Dealer Computer Systems.
    2. Business Systems.
    3. Professional Systems (MD, Lawyers).
    4. Professional Systems (CPA's).
  - Auto Dealer Computer System Division divided into four major product areas (Service, Accounting, Parts, Sales).
  - This product-oriented approach resulted from an extensive reorganization from a functional organization.

- BUSINESS PLAN

  - Five year horizon.
  - Criteria are revenue, profit and unit sales; profitability increasingly important.

C. PRODUCT PLANNING AND SELECTION PROCESS

- GENERAL PROCESS

  - Process is not very well defined for going into a general area, but is well defined for products within an existing area.
  - Marketing estimates sales, ROI and defines product.
  - Marketing makes recommendation and general manager approves.
  - Process may involve acquisition.

- PRIORITY SETTING
  - Basically budget-driven; assume there will be two major enhancements per year and one new product every two years.
- CUSTOMER FEEDBACK
  - Through sales force.
  - Whole division's in-depth knowledge.
- CHANGES
  - No changes foreseen.

D. PRODUCT DEVELOPMENT

- ORGANIZATION AND CONTROL
  - One hundred and twenty-five technical staff responsible for new development, enhancements, maintenance and documentation.
- CHANGES
  - Must reduce development costs by substituting hardware for software.

E. MARKETING/DISTRIBUTION

- ORGANIZATION AND APPROACHES
  - Two hundred sales personnel sell turnkey systems, remote batch and hardware (own terminals) to end users (non-DP departments).
  - Sales force is organized geographically.
  - Thirty products are offered, using all marketing approaches.
  - Products are priced using cost and competitive position; value pricing used if there is no effective competition.

- COMPETITION
  - ADP chief competition; CARS, Inc. and Display Data are next.
- CHANGES
  - In several years there may be sales force specialization by product.

F. SERVICE/SUPPORT

- Three hundred and fifty field personnel provide pre and post sales support and maintenance.
- Field staff report to Director of Technical Service within the national sales organization.
- Twenty-five central technical support staff also reports to the Director of Technical service within sales.
- Field sales and technical coordination done on an ad hoc basis.

G. OVERALL TRENDS IN SOFTWARE INDUSTRY AND IMPACT ON YOUR FIRM

- Software will be more important in the hardware/software package; firm is now producing own terminal as a joint venture with Zonic Technical Laboratories (Rey Zon).

CULLINANE CORPORATION

COMPANY PROFILE

A. REVENUES

- $20 million (FY 1979-1980) - 100% from software.

B. SOFTWARE ORGANIZATION

- OVERVIEW

Function:	PLANNING	DEVELOPMENT	MARKETING	SERVICE
Size:	None	93	35*	35*
Highest Title:	None	Sr.V.P.	Sr.V.P.	Reg.Mgr.
Reports To:	-	Pres.	Pres.	Sr.V.P.(Mkt.)

- ORGANIZATION STRUCTURE

  - Organized by application type.
    1. Data base management.
    2. Audit retrieval products.
  - Coordinated by a "Management Committee" of Senior Development, Marketing and Finance officers, formed in early 1980 - 75% effective. Formerly a loose group of technical management and President.

- BUSINESS PLAN

  - None; President "doesn't believe in this kind of thing".

C. PRODUCT PLANNING AND SELECTION PROCESS

- GENERAL PROCESS

  - Product ideas generated from customer feedback as well as from Marketing and President. Development assesses technical feasibility and cost. Management Committee sets priority and makes recommendation. President approves.
  - Exception: New product analysis could involve an acquisition.

- PRIORITY SETTING

  - Customer interest.
  - Customer willingness to contribute dollars for development.

* INPUT estimate.

- CUSTOMER FEEDBACK
  - User groups (company sponsored and autonomous).
  - Hot line.
- CHANGES
  - No changes foreseen.

D. PRODUCT DEVELOPMENT

- ORGANIZATION AND CONTROL
  - Technical staff is organized into ten project groups (one per principal product).
  - Ninety three total staff, with 75 programmer analysts in new development (10), enhancements (40) and maintenance (25). Eighteen technicians are in a quality assurance group.
  - PERT used to control individual program modules.
- PRODUCTIVITY
  - TSO-type software development.
- CHANGES
  - No major changes foreseen.

E. MARKETING/DISTRIBUTION

- ORGANIZATION AND APPROACHES
  - U.S. sales force sells software only (use representatives abroad who may handle many types of products).
  - Sales force is organized by two main product lines and then geographically.
  - Software sold to end users, with increasing emphasis on non-DP departments; did not wish to discuss other distribution methods.
  - Seminars and trade shows are chief marketing approach. Advertising and direct mail feed the seminars. Sales calls come from seminars or direct queries. Demonstrations are used where feasible.
  - Twelve products are offered.
  - Revenue per salesman appears to be low.

- COMPETITION

  - Data base management systems: IBM, Software AG.
  - Audit retrieval: Pansophic, Informatics.

- CHANGES

  - No major changes foreseen.

F. SERVICE/SUPPORT

- Pre and post sales support and maintenance is under marketing.
- Technical support staff specialize by two main product areas.
- Many sales personnel begin as a technical support for 6-12 months.
- Central technical support function in Development.

G. OVERALL TRENDS IN SOFTWARE INDUSTRY AND IMPACT ON YOUR FIRM

- Proprietary information.

MANAGEMENT SCIENCE AMERICA

COMPANY PROFILE

A. REVENUES

- $35 million; 100% from software.

B. SOFTWARE ORGANIZATION

- OVERVIEW

Function:	PLANNING	DEVELOPMENT	MARKETING	SERVICE
Size:	Ad hoc	600-750	60+	150
Highest Title:	-	Grp.V.P.	Grp.V.P.	Reg.Op.Mgr.
Reports To:	-	Pres.	Pres.	Reg.V.P.(Mkt.)

- ORGANIZATION

  - Organized by product type: Applications and Internal Support (data base management, communications, etc.)
  - Coordinated by:
    1. Regular meetings across organizational components.
    2. Many Senior Development staff have had Marketing positions.

- BUSINESS PLAN

  - One to five year horizon.
  - Criteria are revenues and MBO-type targets for Development.

C. PRODUCT PLANNING AND SELECTION PROCESS

- GENERAL PROCESS

  - Not a formal process, mostly ad hoc.
  - Marketing produces general product specification and market assessment and Development will flesh it out and estimate costs.
  - Marketing sets priorities and decides on implementation for enhancements.
  - Exception
    - Ad hoc committee of Development and Marketing, chaired by President for review of new products.

- PRIORITY SETTING

  - "Not a clear cut process". In order of priority:
    - Mandatory customer support and maintenance.
    - Technical changes (generated internally).
    - Customer requests.
    - Internal ideas.

- CUSTOMER FEEDBACK

  - User group.
  - Sales force.

- CHANGES

  - Development believes process should be more organized to ensure that time-consuming informal agreements are translated into uniform implementation. Marketing is satisfied with present arrangements.

D. PRODUCT DEVELOPMENT

- ORGANIZATION AND CONTROL

  - Six hundred to 750 technical staff are divided into project groups for eight application products and three internal technical support areas.
  - Currently use an effective manual control system; getting automated system to build a data base for better project estimation.

- PRODUCTIVITY

  - Company believes that many existing aids are oriented to "getting system up" and do not further life cycle maintainability.
  - Use I/0 module generator, TSO and moving to one terminal per programmer.
  - Aim to have data base management communications and report generation external to application product code (structured design).

- CHANGES

  - More use of software to build software - already underway.

E. MARKETING/DISTRIBUTION

- ORGANIZATION AND APPROACHES

  - Fifty-five sales personnel sell eight software products (most products have a number of modules) to end users.
  - Sales force is organized geographically and use all marketing approaches except telemarketing and demonstrations.
  - Software pricing is proprietary.

- COMPETITION

  - Company feels they are pre-eminent in their field. When pressed, named Software International and McCormack and Dodge as leading competition.

- CHANGES

  - Foresee no significant changes; feel process is already optimized.

F. SERVICE/SUPPORT

- Pre-sales support is under District Sales Manager.

- Post-sale support and maintenance is under Regional Operations Manager who reports to Regional Marketing Vice President.

- Technical support staff specialize by applications packages; however, there is not always one package per person.

G. OVERALL TRENDS IN SOFTWARE INDUSTRY AND IMPACT ON YOUR FIRM

- Industry will grow and MSA will be on the "leading edge".

NATIONAL CSS
(REMOTE COMPUTING SERVICE)

COMPANY PROFILE

A. REVENUES

- $68 million (FY 1979). Remote computer services revenues (i.e., excluding Zytron and Turnkey Systems revenues) are approximately 65% (estimated from published data). Software percentage cannot be estimated.

B. SOFTWARE ORGANIZATION

- OVERVIEW

Function:	PLANNING	DEVELOPMENT	MARKETING	SERVICE
Size:	1. Ad.Tech. 2. Mkt.Pln.	1. Ad.Tech.(12) 2. Dev.(120)	1. Mktg.(60) 2. Sales(300)	200
Highest Title:	1. V.P. 2. Mgr.	V .P.	1. V.P. 2. V.P.	Product Consultant
Reports To:	1. Pres. 2. V.P.	Pres.	Pres.	Dist.Mgr.

- ORGANIZATION STRUCTURE
  - Organized by technology-driven and market-driven products.
  - Marketing performs most coordination tasks.

- BUSINESS PLAN
  - Three year horizon (minimum): Revenue used as criterion.

C. PRODUCT PLANNING AND SELECTION PROCESS

- GENERAL PROCESS
  - Application Products.
    - Ideas for nationally - offered products come from successful local products, software vendors approaching top management, Development/Advanced Technology or Marketing Planning.
    - Marketing evaluates for meeting market requirements and ROI.
    - Decision process not formal, but Vice Presidents and President agree on priorities and on make/buy decision.
    - If Development implements, they will flesh out Marketing's general product specification through talks with clients, an analysis of competitive products and from own knowledge.
  - Technology-driven products.
    - Ideas are generated in Advanced Technology's "Ivory Tower".
    - Input is assessment of industry trends, competitive moves and ideas from customer, technical support staff and development.
    - Advanced technology has own budget.

- PRIORITY SETTING

  - Not formalized: ROI and available funds important.
  - Development Vice President and President ultimately decide.

- CUSTOMER FEEDBACK

  - Informal process: Technical support and sales force.
  - Development staff visits leading edge customers.

- CHANGES

  - Process should be more market-driven; marketing staff is being made more technically knowledgeable by hiring outside experts.

D. PRODUCT DEVELOPMENT

- ORGANIZATION AND CONTROL

  - One hundred and twenty technical staff in Development are organized into new development (40), enhancements (40) and maintenance (40).
  - Advanced Technology has an additional 12 technical staff.
  - No formal system of project control.

- PRODUCTIVITY

  - Depend on semi-formal peer review process for quality control and to raise programming standards.

- CHANGES

  - Development of more effective programming standards to identify good programmers earlier.

E. MARKETING/DISTRIBUTION

- ORGANIZATION AND APPROACHES

  - Three hundred sales personnel principally sell remote computing services and also sells NCSS' own hardware.
  - Sales force is organized geographically and sells 50 major products to end users (non-DP departments).
  - All marketing approaches are used; in addition a written analysis is prepared of customer needs.

- COMPETITION

  - "Direct": General Electric and Tymshare.
  - "Real": In-house systems, with minis becoming more important.

- CHANGES

  - No major changes foreseen.

F. SERVICE/SUPPORT

- Most pre and post sales support and maintenance is provided by 200 technical representatives reporting to Branch Sales Manager.

- More complex questions are referred to a "product consultant" who reports to District Manager.

- Maintenance section in Development supports field technical support.

G. OVERALL TRENDS IN SOFTWARE INDUSTRY AND IMPACT ON YOUR FIRM

- Companies should offer users computer services; much of the potential competition (minicomputer firms) are not really service oriented, but want to move hardware.

IV DETAILED TABULATIONS

EXHIBIT IV - I

COMPANY OVERVIEW

	REVENUES (A) ($ MILLION)	NUMBER OF PRODUCTS (B) NON-APPL.	APPL.	PERCEIVED COMPETITION (C)
MAINFRAME VENDORS				
BURROUGHS	2800(D)	UNDER 100	9	NONE (G)
HONEYWELL	500(E)	300+	100+	IBM, UNIVAC, BURROUGHS
UNIVAC	2319(D)	100's	100's	"SYSTEMS HOUSES" AND "HARDWARE VENDORS"
MINICOMPUTER VENDORS				
WANG	322(D)	100's	100's	DATA GEN'L, DEC
HEWLETT-PACKARD	1030(F)	40	10	IBM,PRIME, WANG (G)
UNIVAC (VARIAN)	120(D)	60	(H)	DEC, PRIME
COMPANY NO. 6	250(D)	60	100's	PROPRIETARY

(A) 1979 WORLDWIDE REVENUES.

(B) HONEYWELL, WANG AND CO. #6 PRODUCT COUNTS ARE HIGH BECAUSE THEY COUNT INDIVIDUAL PRODUCT MODULES OR CATALOG ENTRIES. BURROUGHS, H-P AND UNIVAC (VARIAN) COUNTS ARE LOW BECAUSE THEY COUNT PRODUCT GROUPS.

(C) HARDWARE/SOFTWARE PACKAGE COMPETITION.

(D) ENTIRE COMPANY.

(E) LARGE COMPUTERS ONLY.

(F) COMPUTER OPERATIONS.

(G) SOFTWARE ONLY.

(H) FIRM OFFERS SEVERAL OF ITS OWN PRODUCTS PLUS AN UNDETERMINED NUMBER DEVELOPED JOINTLY WITH SOFTWARE HOUSES.

EXHIBIT IV - 2

COMPANY OVERVIEW

	REVENUES ($ MILLION)	NUMBER OF PRODUCTS	PERCEIVED COMPETITION
TURNKEY VENDORS			
EDS (COMPUSOURCE)	10(A)	7	IBM, BASIC 4
KEYDATA	2.5(A)	18	INDUSTRY SPECIALISTS; BASIC 4, MICRO-DATA, QANTEL
REYNOLDS & REYNOLDS	38(A)	30	ADP, CARS, DISPLAY DATA
SOFTWARE VENDORS			
CULLINANE CORP.	20	12	IBM, SOFTWARE AG, PANSOPHIC, INFOR-MATICS
MSA	35	8	SOFTWARE INT'L McCORMACK & DODGE
NCSS	45(B)	50	GE, TYMSHARE; IN-HOUSE SYSTEMS

(A) FROM TURNKEY SYSTEMS; TYPICALLY, SOFTWARE ACCOUNTS FOR 33% OF PACKAGE.

(B) FROM REMOTE COMPUTING SERVICES (APPROXIMATELY).

EXHIBIT IV - 3

SOFTWARE PLANNING AND APPROVAL PROCESS

	ORIGINATES PROPOSAL	DEFINES PRODUCT	PROJECTS SALES	ESTIMATES COST	SETS PRIORITY	APPROVES PRODUCT
MAINFRAME VENDORS						
BURROUGHS	P	P	M	D	M	C
HONEYWELL	P	P	M	D	C	G
UNIVAC	M	M	M	M	C	G
MINICOMPUTER VENDORS						
WANG	M	M	M	D	D(1)	D(1)
HEWLETT-PACKARD	M	M,D	M	D	C	C
UNIVAC (VARIAN)	M,D	M,D	M	M	M	C
CO. #6	M,D	M	M	D	C	G

(1) PRESIDENT IS HEAD OF DEVELOPMENT.

LEGEND: C = COMMITTEE, D = DEVELOPMENT, G = GENERAL MANAGEMENT, M = MARKETING, P = PLANNING

EXHIBIT IV - 4

SOFTWARE PLANNING AND APPROVAL PROCESS

	ORIGINATES PROPOSAL	DEFINES PRODUCT	PROJECTS SALES	ESTIMATES COST	SETS PRIORITY	APPROVES PRODUCT
TURNKEY VENDORS						
EDS (COMPUSOURCE)	M	M	M	M,D	M,D	G
KEYDATA	M	M	M	M,D	C	C
REYNOLDS & REYNOLDS	M	M	M	M	M	G
SOFTWARE VENDORS						
CULLINANE CORP.	M,C	M,D	M	D	C	G
MSA	M	M,D	M	D	M	M
NCSS	M	M,D	M	C	C	G

LEGEND: C = COMMITTEE, D = DEVELOPMENT, G = GENERAL MANAGEMENT, M = MARKETING

EXHIBIT IV - 5

EXCEPTIONS TO SOFTWARE PLANNING AND APPROVAL PROCESS

	PRODUCT EXCEPTION	REASON
MAINFRAME VENDORS		
BURROUGHS	OPERATING SYSTEMS	PART OF HARDWARE PLANNING PROCESS.
HONEYWELL	OPERATING SYSTEMS	OFTEN INITIATED BY DEVELOPMENT, BASED ON INTERNAL ASSESSMENT.
	APPLICATIONS	OFTEN DEVELOPED "AS NEEDED" (e.g., TO MEET CUSTOMER COMMITMENT)
UNIVAC	OPERATING SYSTEMS	IN A SEPARATE DIVISION.
MINICOMPUTER VENDORS		
WANG	APPLICATIONS	DEVELOPED LOCALLY, WITH LITTLE OR NO CENTRAL DIRECTION.
HEWLETT-PACKARD	OPERATING SYSTEM	OFTEN INITIATED BY DEVELOPMENT, BASED ON INTERNAL ASSESSMENT.
UNIVAC (VARIAN)	DEVELOPMENT AIDS	MAY BE INITIATED BY DEVELOPMENT WITH MARKETABILITY DETERMINED LATER
	APPLICATIONS	OFTEN DEVELOPED JOINTLY WITH THIRD PARTIES, OUTSIDE OF USUAL PLANNING PROCESS.
CO. #6	APPLICATIONS	DEVELOPED LOCALLY, WITH NO CENTRAL DIRECTION.

EXHIBIT IV - 6

EXCEPTIONS TO SOFTWARE PLANNING AND APPROVAL PROCESS

	PRODUCT EXCEPTION	REASON
TURNKEY VENDORS		
EDS (COMPUSOURCE)	NONE	VERY INFORMAL PROCESS
KEYDATA	CROSS-INDUSTRY APPLICATIONS	COMPANY IS VERY INDUSTRY ORIENTED
REYNOLDS & REYNOLDS	LESS COSTLY ENHANCEMENTS DO NOT REQUIRE MANAGEMENT APPROVAL	
SOFTWARE VENDORS		
CULLINANE CORP.	NEW PRODUCT AREAS	MIGHT INCLUDE AN ANALYSIS OF ACQUISITION
MSA	NEW PRODUCT AREAS	AD HOC GROUP UNDER PRESIDENT
NCSS	"TECHNOLOGY-DRIVEN" PRODUCTS	DEVELOPED BY "IVORY TOWER" ADVANCED TECHNOLOGY GROUP

EXHIBIT IV - 7

SOFTWARE DEVELOPMENT PRIORITIES

	CRITERIA USED FOR PRIORITY-SETTING		
	ROI	BUDGET	OTHER
MAINFRAME VENDORS			
BURROUGHS	X		"TOTAL SOLUTIONS"; CUSTOMER SATISFACTION
HONEYWELL		X	
UNIVAC	X	X	MARKET SHARE
MINICOMPUTER VENDORS			
WANG			"LEVERAGING" EXISTING PRODUCTS
HEWLETT-PACKARD	X	X	TECHNOLOGICAL "LEAPS"; CUSTOMER NEEDS
UNIVAC (VARIAN)	X		CUSTOMER NEEDS
CO. #6	X		MARKETING STRATEGY

EXHIBIT IV - 8

SOFTWARE DEVELOPMENT PRIORITIES

	CRITERIA USED FOR PRIORITY-SETTING		
	ROI	BUDGET	OTHER
TURNKEY VENDORS			
EDS (COMPUSOURCE)	X(1)		CUSTOMER NEEDS
KEYDATA	X(2)		CUSTOMER NEEDS
REYNOLDS & REYNOLDS		X	
SOFTWARE VENDORS			
CULLINANE CORP.			CUSTOMER INTEREST & WILLINGNESS TO FINANCE
MSA			CUSTOMER NEEDS; INTERNAL IDEAS
NCSS	X		AVAILABLE FUNDS

(1) IMPORTANT FOR MAJOR INVESTMENTS.

(2) SECONDARY IMPORTANCE.

EXHIBIT IV - 9

SOURCES OF CUSTOMER FEEDBACK

	USER GROUPS	VISITS TO CUSTOMERS	SALES FORCE	OTHER
MAINFRAME VENDORS				
BURROUGHS	X		X	TECH SUPPORT STAFF; CUSTOMER HOTLINE(1)
HONEYWELL	X	X	X	SURVEYS
UNIVAC	X		X	
MINICOMPUTER VENDORS				
WANG	X		X	SURVEYS
HEWLETT-PACKARD	X	X(1)		
UNIVAC (VARIAN)		X	X	
CO. #6		X	X	

(1) MOST IMPORTANT.

EXHIBIT IV - 10

SOURCES OF CUSTOMER FEEDBACK

	USER GROUPS	VISITS TO CUSTOMERS	SALES FORCE	OTHER
TURNKEY VENDORS				
EDS (COMPUSOURCE)		X	X	MINICOMPUTER VENDORS (IMPORTANT), MKT. RESEARCH
KEYDATA	X	X		FIELD MAINTENANCE STAFF
REYNOLDS & REYNOLDS			X	EXISTING IN-DEPTH KNOWLEDGE
SOFTWARE VENDORS				
CULLINANE CORP.	X			HOT LINE
MSA	X		X	
NCSS		X	X	TECHNICAL SUPPORT FIELD STAFF

EXHIBIT IV - 11

MOST IMPORTANT CHANGE EXPECTED IN PLANNING/SELECTION PROCESS (1)

	BETTER METHODS OF DEFINING USER NEEDS	NO CHANGES (REASON)
MAINFRAME VENDORS		
BURROUGHS	X	
HONEYWELL		"COMFORTABLE" WITH PROCESS; DIFFICULT TO CHANGE IN ANY EVENT.
UNIVAC		ALREADY MADE LARGE CHANGES
MINICOMPUTER VENDORS		
WANG	X	
HEWLETT-PACKARD		ALREADY UNDERGOING EXTENSIVE CHANGES IN ORGANIZATION AND PHILOSOPHY.
UNIVAC (VARIAN)	X	
CO. #6	X	

(1) QUESTION WAS OPEN-ENDED AND UNPROMPTED.

EXHIBIT IV - 12

MOST IMPORTANT CHANGE EXPECTED IN PLANNING/SELECTION PROCESS (1)

	CHANGE	REASON
TURNKEY VENDORS		
EDS (COMPUSOURCE)	MORE FORMAL PLANNING	IMPORTANT FOR ENTERING NEW MARKETS
KEYDATA	EXAMINE ENHANCEMENT REQUESTS MORE CRITICALLY	SOME PREVIOUS ENHANCEMENTS NOT VALUABLE
REYNOLDS & REYNOLDS	NONE FORESEEN	
SOFTWARE VENDORS		
CULLINANE CORP.	NONE FORESEEN	
MSA	MORE FORMAL PLANNING (2)	PRESENT INFORMALITY IMPRECISE & WASTES TIME
NCSS	PROCESS MORE MARKET DRIVEN	

(1) RESPONSES TO AN OPEN-ENDED, NON-PROMPTED QUESTION.

(2) AN ALTERNATE MSA VIEW IS THAT NO CHANGES ARE REQUIRED.

EXHIBIT IV - 13

SOURCE OF APPLICATIONS SOFTWARE

	IN-HOUSE DEVELOPMENT	THIRD PARTY: SOLD & MAINTAINED BY HARDWARE COMPANY	THIRD PARTY: SOLD & MAINTAINED BY THIRD PARTY (1)
MAINFRAME VENDORS			
BURROUGHS	X		X
HONEYWELL	X		
UNIVAC	X	X	X
MINICOMPUTER VENDOR			
WANG			X(2)
HEWLETT-PACKARD	X		
UNIVAC (VARIAN)	X(3)	X(3)	X(3)
CO. #6			X(2)

(1) WITH ENCOURAGEMENT OF HARDWARE COMPANY.

(2) INCLUDING USER-DEVELOPED PROGRAMS.

(3) MOST APPLICATIONS ARE DEVELOPED AS A JOINT VENTURE WITH A THIRD PARTY.

EXHIBIT IV - 14

SOURCE OF APPLICATIONS SOFTWARE

		THIRD PARTY	
	IN-HOUSE DEVELOPMENT	SOLD & MAINTAINED BY VENDOR	SOLD & MAINTAINED BY THIRD PARTY
TURNKEY VENDORS			
EDS (COMPUSOURCE)		X	
KEYDATA		X	
REYNOLDS & REYNOLDS	X	X(I)	
SOFTWARE VENDORS			
CULLINANE CORP.	X	X(I)	
MSA	X		
NCSS	X	X	X

(I) SOFTWARE ACQUISITION POSSIBLE.

EXHIBIT IV - 15

SOFTWARE PRODUCTIVITY TECHNIQUES

	STRUCTURED DESIGN	STRUCTURED LANGUAGES	WALK THROUGHS/ PEER REVIEW	TERMINAL PER PROGRAMMER
MAINFRAME VENDORS				
BURROUGHS	X	X		
HONEYWELL	X	X		X
UNIVAC	X		X	
MINICOMPUTER VENDORS				
WANG (1)				
HEWLETT-PACKARD	X	X	X(2)	
UNIVAC (VARIAN)		X	X	X
CO. #6	X	X	X	X

(1) DID NOT PROVIDE INFORMATION ON TECHNIQUES.

(2) PART OF H-P's PROCESS OF IMPROVED QUALITY THROUGH SELF-MOTIVATION.

EXHIBIT IV - 16

SOFTWARE PRODUCTIVITY TECHNIQUES

	TECHNIQUE
TURNKEY VENDORS	
EDS (COMPUSOURCE)	NONE - MAINTENANCE ENVIRONMENT
KEYDATA	NONE - MAINTENANCE ENVIRONMENT
REYNOLDS & REYNOLDS	NOT REPORTED
SOFTWARE VENDORS	
CULLINANE CORP.	TERMINAL PER PROGRAMMER
MSA	STRUCTURED DESIGN
NCSS	PEER REVIEW

EXHIBIT IV - 17

MOST IMPORTANT CHANGES EXPECTED IN THE SOFTWARE DEVELOPMENT PROCESS (1)

	INCREASE AUTOMATION	REDUCE COSTS	IMPROVE QUALITY	OTHER
MAINFRAME VENDORS				
BURROUGHS		X		
HONEYWELL	X			
UNIVAC				X(2)
MINICOMPUTER VENDORS				
WANG				X(3)
HEWLETT-PACKARD			X	
UNIVAC (VARIAN)	X			
CO. #6	X		X	

(1) RESPONSES TO AN OPEN-ENDED, UNPROMPTED QUESTION.

(2) ORGANIZATIONAL CHANGE; MOVING APPLICATIONS DEVELOPMENT TO MARKETING.

(3) LACK OF RESPONSE MAY REFLECT UNWILLINGNESS TO DISCUSS CHANGES.

EXHIBIT IV - 18

MOST IMPORTANT CHANGES EXPECTED IN THE SOFTWARE DEVELOPMENT PROCESS (1)

	CHANGE
TURNKEY VENDORS	
EDS (COMPUSOURCE)	MAY DEVELOP SOFTWARE IN-HOUSE
KEYDATA	MAY HAVE MORE ENHANCEMENT/ MAINTENANCE PERFORMED BY THIRD PARTIES.
REYNOLDS & REYNOLDS	REDUCE COSTS
SOFTWARE VENDORS	
CULLINANE CORP.	NONE FORESEEN
MSA	INCREASE AUTOMATION
NCSS	BETTER PROGRAMMING STANDARDS TO IDENTIFY GOOD PROGRAMMERS.

(1) RESPONSES TO AN OPEN-ENDED, UNPROMPTED QUESTION.

EXHIBIT IV - 19

DISTRIBUTION APPROACHES

	SOFTWARE NOW SOLD TO:		
	END USERS	HARDWARE OEM'S	INDEPENDENT SOFTWARE COMPANIES
MAINFRAME VENDORS			
BURROUGHS	X		
HONEYWELL	X		
UNIVAC	X		
MINICOMPUTER VENDORS			
WANG	X	X	
HEWLETT-PACKARD	X	X	
UNIVAC (VARIAN)	X	X	X
CO. #6	X	X	X

EXHIBIT IV - 20

DISTRIBUTION APPROACHES

	SOFTWARE NOW SOLD TO:	
	END USERS	HARDWARE OEM'S
TURNKEY VENDORS		
EDS (COMPUSOURCE)	X	X(1)
KEYDATA	X	
REYNOLDS & REYNOLDS	X	
SOFTWARE VENDORS		
CULLINANE CORP.	X(2)	
MSA	X	
NCSS	X	

(1) SMALL AMOUNT

(2) DID NOT WISH TO DISCUSS ADDITIONAL APPROACHES.

EXHIBIT IV - 21

MARKETING APPROACHES

	DIRECT SALES CALLS	ADVERTISING, DIRECT MAIL, TRADE SHOWS	PHONE MKTG.	SEMINARS	DEMOS
MAINFRAME VENDORS					
BURROUGHS	X	X	X	X(1)	X(1)
HONEYWELL (2)	X				X(3)
UNIVAC	X	X		X	X
MINICOMPUTER VENDORS					
WANG	X				
HEWLETT-PACKARD (4)	X	X	X	X(5)	X
UNIVAC (VARIAN) (4)	X	X	X	X	X
CO. #6	X				

(1) VERY IMPORTANT; ALSO USE MOBILE UNITS.

(2) THE LIMITED NUMBER OF APPROACHES REFLECTS A STRICT DEFINITION OF SOFTWARE MARKETING, i.e., A SEPARATE SALES PROCESS.

(3) FOR APPLICATIONS ONLY.

(4) THE LARGE NUMBER OF APPROACHES REFLECTS A BROAD DEFINITION OF SOFTWARE MARKETING, e.g., INCLUDES HARDWARE/SOFTWARE PACKAGES.

(5) CURRENTLY USED ONLY FOR COMMUNICATIONS AND DATA MANAGEMENT PRODUCTS; PLAN TO USE FOR ALL PRODUCTS.

EXHIBIT IV - 22

MARKETING APPROACHES

	DIRECT SALES CALLS	ADVERTISING, DIRECT MAIL, TRADE SHOWS	PHONE MKTG.	SEMINARS	DEMOS
TURNKEY VENDORS					
EDS (COMPUSOURCE)	X	X	X	X	X(1)
KEYDATA	X	X	X	X	X(1)
REYNOLDS & REYNOLDS	X	X	X	X	X
SOFTWARE VENDORS					
CULLINANE CORP.	X	X(2)		X(1)	X
MSA	X	X		X	
NCSS	X(3)	X	X	X	X

(1) IMPORTANT.

(2) TRADE SHOWS IMPORTANT.

(3) ALSO, WRITTEN ANALYSIS OF USER NEEDS.

EXHIBIT IV - 23

PRICING METHODOLOGY

	COST (& PROFIT)	VALUE TO CUSTOMER	MEET COMPETITION
MAINFRAME VENDORS			
BURROUGHS	X		X
HONEYWELL		X	
UNIVAC		X	X
MINICOMPUTER VENDORS			
WANG (1)			
HEWLETT-PACKARD	X	X	X
UNIVAC (VARIAN)		X	
CO. #6 (2)			

(1) PROPRIETARY.

(2) NOT APPLICABLE - SOFTWARE EITHER BUNDLED OR SUPPLIED BY THIRD PARTY.

EXHIBIT IV - 24

PRICING METHODOLOGY

	COST (& PROFIT)	VALUE TO CUSTOMER	MEET COMPETITION
TURNKEY VENDORS			
EDS (COMPUSOURCE)			X
KEYDATA		X(1)	X
REYNOLDS & REYNOLDS	X	X(1)	X
SOFTWARE VENDORS			
CULLINANE CORP. (2)			
MSA (3)			
NCSS (4)			

(1) DEPENDS ON COMPETITION
(2) UNAVAILABLE
(3) PROPRIETARY
(4) NOT RESPONSIVE.

EXHIBIT IV - 25

SALES FORCE

	SELLS			ORGANIZED BY	
	HARDWARE	SOFTWARE	TURNKEY SYSTEMS (1)	GEOGRAPHY	INDUSTRY/ APPLI- CATION
MAINFRAME VENDORS					
BURROUGHS	X	X(2)		X	X
HONEYWELL	X	X		X	X
UNIVAC	X	X	X(3)	X	X
MINICOMPUTER VENDORS					
WANG	X	(4)		X	
HEWLETT-PACKARD	X	X	(5)	X	X
UNIVAC (VARIAN)	X	X	X	X	
CO. #6	X	(6)		X	

(1) DEFINED AS HARDWARE AND SOFTWARE INTEGRATED INTO A TOTAL SYSTEM DESIGNED TO COMPLETELY FULFILL THE PROCESSING REQUIREMENTS OF AN APPLICATION FOR A USER.

(2) FORMERLY, THERE WERE SOFTWARE SALES SPECIALISTS.

(3) ALSO TIMESHARING AND CONSULTING.

(4) ONLY LANGUAGE AND DATA MANAGEMENT PRODUCTS SOLD; OPERATING SYSTEMS ARE BUNDLED AND APPLICATIONS ARE SOLD BY THIRD PARTIES.

(5) MAY SELL TURNKEY SYSTEMS IN THE FUTURE.

(6) APPLICATION PRODUCTS SOLD BY THIRD PARTIES; OTHER SOFTWARE IS BUNDLED.

EXHIBIT IV - 26

SALES FORCE

	SELLS			ORGANIZED BY	
	HARDWARE	SOFTWARE	TURNKEY SYSTEMS(1)	GEOGRAPHY	INDUSTRY APPLICATION
TURNKEY VENDORS					
EDS (COMPUSOURCE)			X	X	
KEYDATA			X(2)	X	
REYNOLDS & REYNOLDS	X		X(2)	X	(3)
SOFTWARE VENDORS					
CULLINANE CORP.		X		X	X
MSA		X		X	
NCSS	X	X(4)		X	

(1) DEFINED AS HARDWARE AND SOFTWARE INTEGRATED INTO A TOTAL SYSTEM DESIGNED TO COMPLETELY FULFILL THE PROCESSING REQUIREMENTS OF AN APPLICATION FOR A USER.

(2) ALSO SELLS REMOTE COMPUTING SERVICES.

(3) MAY SPECIALIZE BY APPLICATION IN SEVERAL YEARS.

(4) AS PART OF REMOTE COMPUTING SERVICE.

EXHIBIT IV - 27

MOST IMPORTANT FUTURE CHANGE TO SOFTWARE MARKETING PROCESS (1)

MAINFRAME VENDORS	
BURROUGHS	INCREASED EMPHASIS ON END USER SALES.
HONEYWELL	REDUCE SALES COST. (2)
UNIVAC	MORE SOFTWARE SALES TO BALANCE FALLING HARDWARE PRICES.
MINICOMPUTER VENDORS	
WANG	NONE FORESEEN.
HEWLETT-PACKARD	INCREASED EMPHASIS ON END USER SALES.
UNIVAC (VARIAN)	INCREASED EMPHASIS ON END USER SALES.
CO. #6	HAVEN'T ANALYZED QUESTION - MAIN CONSTRAINT ON SALES CURRENTLY IS MANUFACTURING CAPACITY.

(1) RESPONSES TO AN OPEN-ENDED, UNPROMPTED QUESTION.
(2) METHOD OF ACCOMPLISHING THIS IS NOT YET CLEAR.

EXHIBIT IV - 28

MOST IMPORTANT FUTURE CHANGE TO SOFTWARE MARKETING PROCESS (1)

TURNKEY VENDORS	
EDS (COMPUSOURCE)	LOWER HARDWARE PRICES WILL OPEN SMALL BUSINESS MARKET; MAY THAN NEED DIFFERENT DISTRIBUTION CHANNELS.
KEYDATA	WILL PROBABLY PRICE HARDWARE, SOFTWARE & MAINTENANCE SEPARATELY FOR COMPETITIVE REASONS.
REYNOLDS & REYNOLDS	SALES FORCE MAY SPECIALIZE BY PRODUCT IN SEVERAL YEARS.
SOFTWARE VENDORS	
CULLINANE CORP.	NONE FORESEEN
MSA	NONE FORESEEN
NCSS	NONE FORESEEN

(1) RESPONSES TO AN OPEN-ENDED, UNPROMPTED QUESTION.

EXHIBIT IV - 29

FIELD SERVICE/SUPPORT ORGANIZATION

	PRÉ AND POST SALE SUPPORT (1)			MAINTENANCE (1)		
	STAFF SIZE	HIGHEST TITLE	REPORTS TO	HIGHEST TITLE	REPORTS TO	CENTRAL SUPPORT IN (2)
MAINFRAME VENDORS						
BURROUGHS	PROP.	V.P.	EXEC.V.P.	V.P.	EXEC.V.P.	M,D
HONEYWELL	4100(3)	MGR.	BR.MGR.	V.P.(F.E.)	GEN'L MGR.	M,FE
UNIVAC	PROP.	MGR.	BR.MGR.	MGR.	BR.MGR.	M,D
MINICOMPUTER VENDORS						
WANG	PROP.	MGR.	AREA MGR.	MGR.	AREA MGR.	M,D
HEWLETT-PACKARD	PROP.	MGR.	REG.MGR.	MGR.	REG.MGR.	M,D
UNIVAC (VARIAN)	60(3)	MGR.	REG.MGR.	MGR.	REG.MGR.	D
COMPANY NO. 6	PROP.	MGR.	REG.MGR.	MGR.	REG.MGR.	D

(1) PERSONNEL ARE ALL WITHIN MARKETING, EXCEPT HONEYWELL MAINTENANCE.

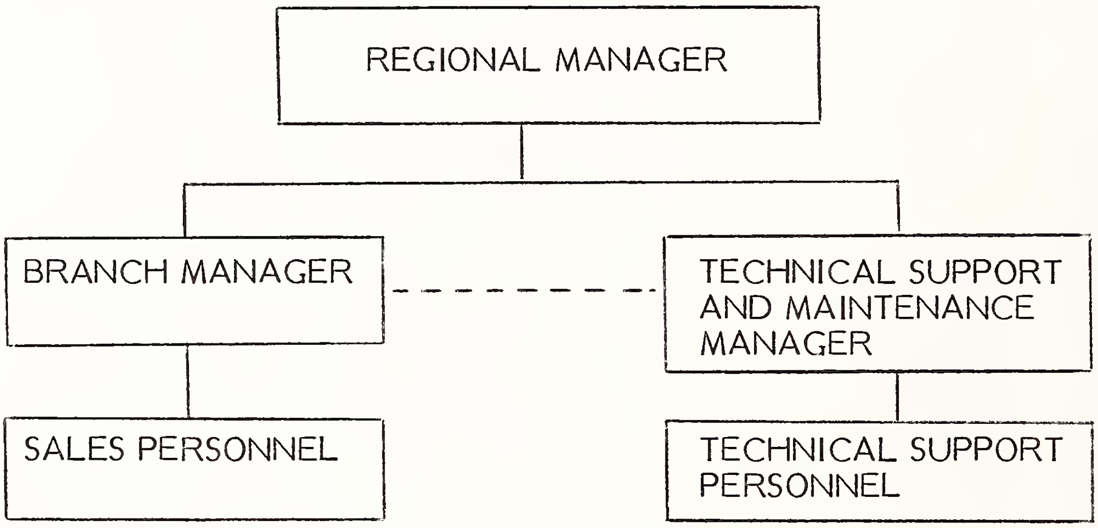
(2) D = DEVELOPMENT, FE = FIELD ENGINEERING, M = MARKETING

(3) HARDWARE AND SOFTWARE.

EXHIBIT IV - 30

SOFTWARE FIELD SUPPORT ORGANIZATION IN A HARDWARE COMPANY

(TYPICAL)



EXCEPTIONS:

- BURROUGHS (MAINFRAMES) - SALES AND MAINTENANCE ARE SEPARATE ORGANIZATIONS UNDER EXECUTIVE VICE PRESIDENT - MARKETING.

- HONEYWELL (MAINFRAMES) - SOFTWARE MAINTENANCE IS IN F.E., WHICH REPORTS TO GENERAL MANAGER.

EXHIBIT IV - 31

FIELD SERVICE/SUPPORT ORGANIZATION

	FIELD SUPPORT (1)				
	STAFF SIZE	HIGHEST TITLE	REPORTS TO	FIELD ORG. UNDER	CENTRAL SUPPORT IN
TURNKEY VENDORS					
EDS (COMPUSOURCE)	50	BR.MGR.	DIR.	DEV.	DEV.
KEYDATA	45	MGR.	REG.MGR.	MKT.	DEV./MKT.
REYNOLDS & REYNOLDS	375	DIR.	V.P.SALES	MKT.	DEV/MKT.
SOFTWARE VENDORS					
CULLINANE CORP.	PROP.	REG.MGR.	SR.V.P.	MKT.	DEV/MKT.
MSA	150	REG.MGR.	REG.V.P.	MKT.	DEV/MKT.
NCSS	200	PROD. CONSULT.	DIST.MGR.	MKT.	DEV.

(1) PRE AND POST SALES SUPPORT AND MAINTENANCE.

EXHIBIT IV - 32

SEPARATIONS THAT MANAGEMENT SEES IN ITS SOFTWARE BUSINESS

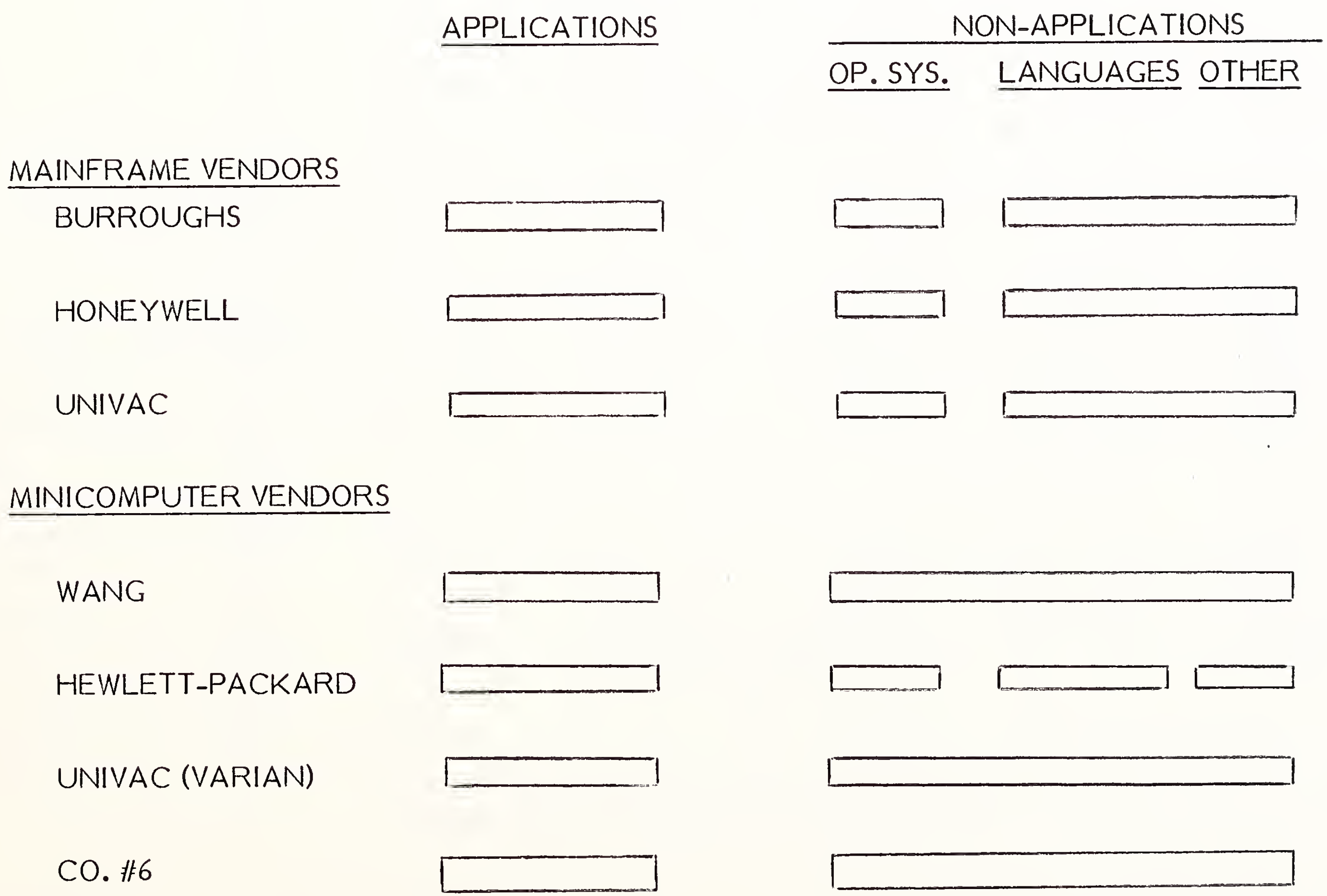


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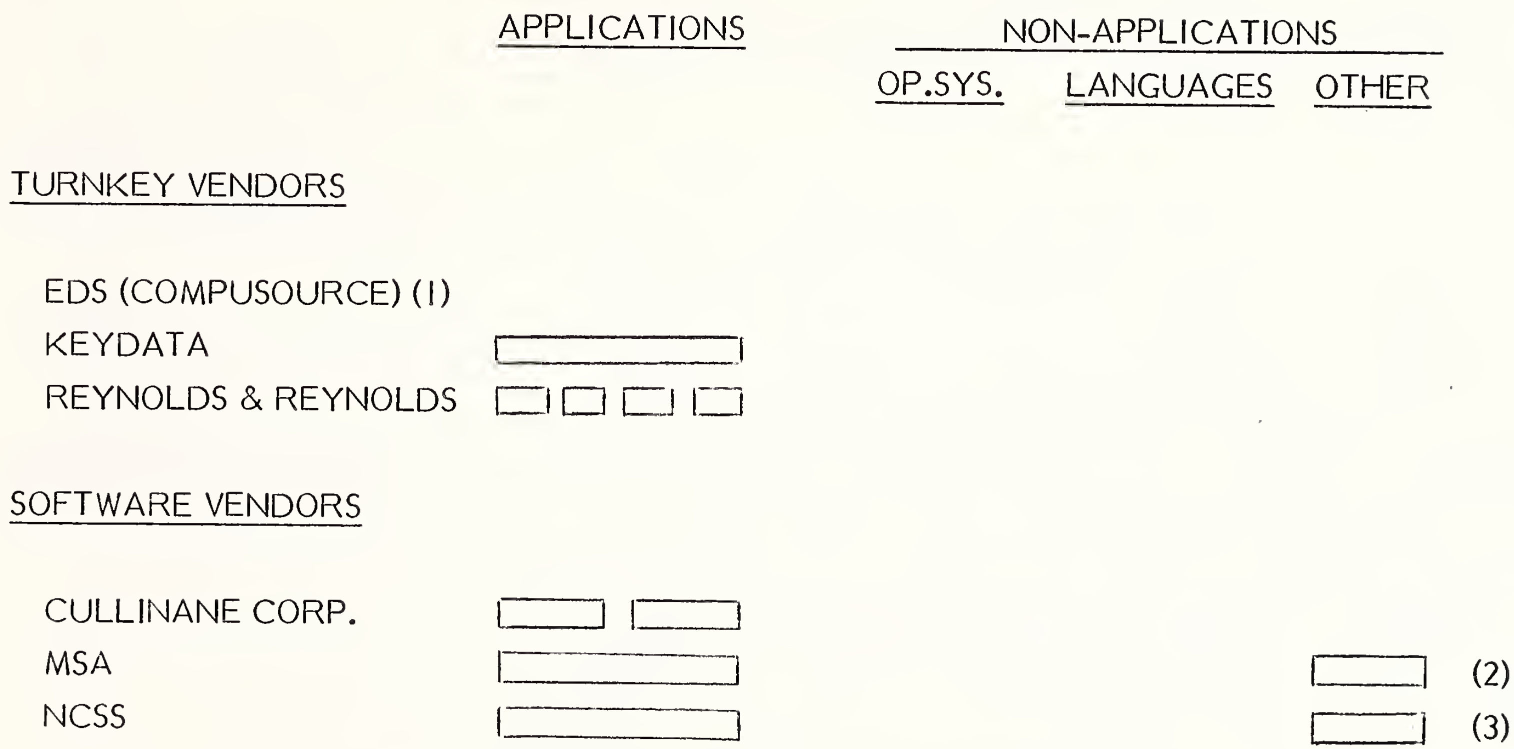
EXHIBIT IV - 33

SEPARATIONS THAT MANAGEMENT SEES IN ITS SOFTWARE BUSINESS



(1) DEVELOPMENT AND MAINTENANCE ORGANIZED BY MACHINE TYPE, THEN APPLICATION PRODUCT TYPE.
(2) INTERNAL SUPPORT (DBMS, COMMUNICATION, ETC.)
(3) TECHNOLOGY DRIVEN PRODUCTS (e.g., NOMAD)

EXHIBIT IV - 34

SOFTWARE BUSINESS PLANNING

	TIME HORIZON YEARS	REVENUE	MARKET SHARE	UNIT SALES	OTHER
MAINFRAME VENDORS					
BURROUGHS	5	X			
HONEYWELL	5-10	X			(1)
UNIVAC	5	X	X		(2)
MINICOMPUTER VENDORS					
WANG (3)					
HEWLETT-PACKARD	5	X		(4)	
UNIVAC (VARIAN)	5	X	X		(2)
CO. #6	5				(5)

(1) CREDIT FOR SELLING NON-SOFTWARE PRODUCTS. (e.g., CERTAIN TERMINALS); CALLED "PULL THROUGH".

(2) COST, PROFIT.

(3) INFORMATION NOT SUPPLIED.

(4) INTERNAL TRANSFER PRICE FOR BUNDLED OPERATING SYSTEMS; CALLED "INTERNAL OEM SALES".

(5) SOFTWARE IS BUNDLED OR SOLD BY A THIRD PARTY. THERE ARE NO QUANTITATIVE TARGETS.

EXHIBIT IV - 35

SOFTWARE BUSINESS PLANNING

	TIME HORIZON YEARS	REVENUE	MARKET SHARE	UNIT SALES	OTHER
TURNKEY VENDORS					
EDS (COMPUSOURCE)	1	X	X	X	
KEYDATA	5	X	X	X	(1)
REYNOLDS & REYNOLDS	5	X		X	(2)
SOFTWARE VENDORS					
CULLINANE CORP.	NONE				(3)
MSA	1,5	X			(4)
NCSS	3 OR MORE	X			

(1) MARKET SHARE IS PRIMARY; DERIVE UNIT SALES & REVENUE.

(2) PROFIT (IMPORTANCE INCREASING).

(3) NO BUSINESS PLAN.

(4) MBO-TYPE OBJECTIVES FOR DEVELOPMENT.

EXHIBIT IV - 36

DEVELOPMENT AND MARKETING ORGANIZATION

	DEVELOPMENT			MARKETING		
	STAFF SIZE	HIGHEST TITLE	REPORTS TO	HIGHEST TITLE	REPORTS TO	CENTRAL SUPPORT IN
MAINFRAME VENDORS						
BURROUGHS	PROP	GEN'L MGR.(1) GEN'L MGR.(2)	VICE CH.(1) V.P/GRP. EXEC(2)	PROP	EXEC.V.P.	PRES.
HONEYWELL	700	DIR.	ASST.GEN'L MGR.	4800(3)	AREA V.P.	GEN'L MGR.
UNIVAC	PROP	DIR.	V.P.	PROP.	PRES.	CORP.PRES
MINICOMPUTER VENDORS						
WANG	PROP.	PRES.	--	PROP.	EXEC.V.P.	PRES.
HEWLETT-PACKARD	300	DIV.MGR.	GEN'L MGR.	N/A	DIV.MGR.	GEN'L MGR.
UNIVAC (VARIAN)	160	DIR.	V.P.(CORP)	115(3)	V.P.	V.P.(CORP)
COMPANY NO. 6	PROP.	DIR.	VP/GEN'L MGR.	PROP	VP/GEN'L MGR.	EXEC.V.P.

(1) APPLICATIONS

(2) OPERATING SYSTEMS.

(3) HARDWARE AND SOFTWARE.

EXHIBIT IV - 37

DEVELOPMENT AND MARKETING ORGANIZATION

	DEVELOPMENT			MARKETING		
	STAFF SIZE	HIGHEST TITLE	REPORTS TO	STAFF SIZE	HIGHEST TITLE	REPORTS TO
TURNKEY VENDORS						
EDS (COMPUSOURCE)	NOT AVAIL.	V.P.	PRES.	100	V.P.	PRES.
KEYDATA	26+	V.P.	PRES.	45	V.P.	PRES.
REYNOLDS & REYNOLDS	125	DIR.	V.P.	210	V.P.	SR.V.P.
SOFTWARE VENDORS						
CULLINANE CORP.	93	SR.V.P.	PRES.	PROP.	SR.V.P.	PRES.
MSA	600-750	GRP.V.P.	PRES.	60+	GRP.V.P.	PRES.
NCSS	130	V.P.	PRES.	360	V.P.	PRES.

EXHIBIT IV - 38

ORGANIZATIONAL CHANGES AFFECTING SOFTWARE (1)

MAINFRAME VENDORS	WITHIN PREVIOUS YEAR	EXPECTED IN COMING YEAR
BURROUGHS	DEVELOPMENT - APPLICATIONS DEVELOPMENT UNIFIED IN THE PROGRAM PRODUCTS DIVISION	
HONEYWELL	MARKETING, MAINTENANCE - SOFTWARE MAINTENANCE TRANSFERRED TO F.E. FROM MARKETING	
UNIVAC	MARKETING, PRODUCT DIVISION - APPLICATIONS DEVELOPMENT BEING TRANSFERRED TO MARKETING.	

(1) UNDERLINED DEPARTMENTS ARE THOSE AFFECTED BY THE CHANGE.

EXHIBIT IV - 38 (continued)

ORGANIZATIONAL CHANGES AFFECTING SOFTWARE (1)

	WITHIN PREVIOUS YEAR	EXPECTED IN COMING YEAR
MINICOMPUTER VENDORS		
WANG		PLANNING - CORPORATE HEAD QUARTERS TO BE MORE INVOLVED IN APPLICATIONS DEFINITION
HEWLETT-PACKARD	ALL AREAS - SOFTWARE MADE A SEPARATE ORGANIZATIONAL ENTITY	
UNIVAC (VARIAN)	ALL AREAS - CONTINUOUS REORGANIZATION SINCE ACQUISITION IN 1978.	
CO. #6		PLANNING - SOFTWARE PLANNING FUNCTIONS TO BE CENTRALIZED

(1) UNDERLINED DEPARTMENTS ARE THOSE AFFECTED BY THE CHANGE.

EXHIBIT IV - 39

ORGANIZATIONAL CHANGES AFFECTING SOFTWARE (1)

	WITHIN PREVIOUS YEAR	EXPECTED IN COMING YEAR
TURNKEY VENDORS		
EDS (COMPUSOURCE)	ALL AREAS - CHANGED FROM FUNCTIONAL TO PRODUCT ORGANIZATION; WASN'T FEASIBLE TO ORGANIZE MARKETING BY PRODUCT.	
KEYDATA		DEVELOPMENT - WILL PROBABLY CONSOLIDATE PROGRAMMING IN DEVELOPMENT.
REYNOLDS & REYNOLDS	ALL AREAS - CHANGED FROM A FUNCTIONAL TO PRODUCT ORGANIZATION TO INCREASE VERTICAL MARKET PENETRATION.	

(1) UNDERLINED DEPARTMENTS ARE THOSE AFFECTED BY THE CHANGE.

EXHIBIT IV - 39 (continued)

ORGANIZATIONAL CHANGES AFFECTING SOFTWARE (1)

SOFTWARE VENDORS	WITHIN PREVIOUS YEAR	EXPECTED IN COMING YEAR
CULLINANE CORP.	ALL AREAS - "MANAGEMENT COMMITTEE" SET UP TO COORDINATE OPERATIONS AND POLICY.	
MSA	PLANNING - COMMITTEE TO DETERMINE PRODUCT FEATURES.	
NCSS	DEVELOPMENT - DIVIDED INTO DEVELOPMENT AND ADVANCED TECHNOLOGY GROUPS.	

(1) UNDERLINED DEPARTMENTS ARE THOSE AFFECTED BY THE CHANGE.

EXHIBIT IV - 40

RESPONDENTS' VIEWS OF TRENDS IN SOFTWARE INDUSTRY (1)

	CHANGE
MAINFRAME VENDORS	
BURROUGHS	MORE "TOTAL SOLUTION INDUSTRY APPLICATIONS".
HONEYWELL	INCREASING IMPORTANCE OF "INDUSTRY SPECIFIC" APPLICATIONS.
UNIVAC	MORE "INDUSTRY-ORIENTED APPLICATIONS SOFTWARE".
MINICOMPUTER VENDORS	
WANG	INCREASING "INDUSTRY FOCUS".
HEWLETT-PACKARD	WILL BE USABLE BY EVERYONE ("LIKE THE TELEPHONE")
UNIVAC (VARIAN)	INCREASING ATTENTION TO THE END USER.
CO. #6	INCREASING ATTENTION ON THE END USER (VIA "VERY HIGH LEVEL LANGUAGES AND QUERY LANGUAGES").

(1) RESPONSES TO AN OPEN-ENDED, UNPROMPTED QUESTION.

EXHIBIT IV - 41

RESPONDENTS' VIEWS OF TRENDS IN SOFTWARE INDUSTRY (1)

	CHANGE
TURNKEY VENDORS	
EDS (COMPUSOURCE)	MORE DIRECT SALES TO SMALLER BUSINESSES.
KEYDATA	REDUCTION OF DEPENDENCE ON PROGRAMMERS.
REYNOLDS & REYNOLDS	SOFTWARE WILL BE MORE IMPORTANT IN SOFTWARE/HARDWARE PACKAGE.
SOFTWARE VENDORS	
CULLINANE CORP.	PROPRIETARY.
MSA	GROWTH, WITH MSA ON LEADING EDGE.
NCSS	USERS SHOULD BE OFFERED SERVICES, NOT HARDWARE.

(1) RESPONSES TO AN OPEN-ENDED, UNPROMPTED QUESTION.

APPENDIX A: RESPONDENTS

RESPONDENTS - HARDWARE COMPANIES

- ANONYMOUS (NO. 6).

    - DIRECTOR, SOFTWARE ENGINEERING

- BURROUGHS

    - CORPORATE DIRECTOR, GENERAL PRODUCTS AND SYSTEMS

- HEWLETT-PACKARD

    - SOFTWARE PRODUCTS MANAGER
    - DEVELOPMENT SECTION MANAGER
    - MARKETING MANAGER, SOFTWARE SUPPORT SERVICES

- HONEYWELL (LARGE COMPUTERS)

    - DIRECTOR, SOFTWARE DEVELOPMENT PROGRAM
    - PROGRAM MANAGER, MARKETING

- SPERRY-UNIVAC (MINICOMPUTER OPERATIONS)

    - MANAGER, OPERATING SYSTEMS DEVELOPMENT
    - DISTRIBUTED DP MARKETING MANAGER
    - DIRECTOR, CORPORATE COMMUNICATIONS

- SPERRY-UNIVAC (MAINFRAMES)

    - DIRECTOR, INDUSTRY APPLICATIONS SOFTWARE (WRITTEN RESPONSE, APPROVED BY VICE PRESIDENT, MARKET STRATEGY AND PLANS)

RESPONDENTS - TURNKEY & SOFTWARE COMPANIES

- EDS
  - VICE PRESIDENT, BUSINESS SYSTEM DEVELOPMENT
  - SENIOR SYSTEMS ENGINEER
- KEYDATA
  - DIRECTOR, MARKETING
- REYNOLDS & REYNOLDS
  - VICE PRESIDENT, MARKETING
- CULLINANE CORPORATION
  - VICE PRESIDENT, PRODUCT DEVELOPMENT
  - VICE PRESIDENT, MARKETING COMMUNICATIONS
  - ASSISTANT TO THE PRESIDENT
- MSA
  - MANAGER, ADMINISTRATIVE SERVICES
  - ACTING MANAGER, PRODUCT PLANNING
- NCSS
  - VICE PRESIDENT, ADVANCED TECHNOLOGY
  - MANAGER, MARKET PLANNING

HARDWARE MANUFACTURER RESPONDENTS: RESPONSES APPLICABLE TO THE FOLLOWING COMPUTER SYSTEMS

COMPANY	SOFTWARE FOR:
• BURROUGHS	B2900 & ABOVE
• HONEYWELL	LEVEL 66 & ABOVE
• UNIVAC	90 & 1100 SERIES
• WANG	VS SYSTEMS
• HEWLETT-PACKARD	SERIES 3000
• UNIVAC (VARIAN)	V77
• CO. #6	MINICOMPUTERS

APPENDIX B: QUESTIONNAIRE

SOFTWARE BUSINESS MANAGEMENT QUESTIONNAIRE

INPUT is studying the approaches used in managing software product development and marketing.

In return for your cooperation we will send you a summary of our report when it is completed. If any question involves proprietary data, please indicate this and we will treat this data confidentially.

We will be looking at four major areas:

- The product selection and definition process.
- The organization of the product development process.
- The way in which business performance is evaluated.
- The marketing/distribution organization and approach.

I. ORGANIZATION

Ia. How do the product planning, development and marketing functions fit into the general organizational structure of the firm?

Ib. How are these major functions coordinated?

Ic. Is your software business organized by type of product (e.g., operating systems, compilers, etc)? If no, how is it organized,

1d. Is there a formal business plan for software products?

( ) YES ( ) NO

If yes, what is the plan's time horizon? __________years.

What performance criteria are used for management controls in the plan? Do these differ by type of product?

PRODUCT TYPE	COST	REVENUE	PROFIT	MARKET SHARE	NUMBER OF LICENSES	NUMBER OF CUSTOMERS	OTHER
Operating Systems							
Compilers/Assemblers							
Communications							
Programming/Conversion Aids							
Sort/Merge & Other Utilities							
Data Management/Query/ Report Generators							
Application Packages							
Other							
(Describe)							

II. PRODUCT SELECTION AND DEFINITION

2a. How does your firm decide which general product areas and particular products are to be developed? Who makes the final decision?

2b. How do you receive feedback from customers for product changes?

2c. Does the selection process vary depending on whether it is a new product or an enhancement to an existing product?

( ) YES ( ) NO

If yes, explain.

Please explain how your firm distinguishes between a new product and an enhancement?

2d. Does the product selection process vary depending on the type of product?

	YES	NO	EXPLANATION
Operating System.	____	____	____________
Compiler/Assembler.	____	____	____________
Communication.	____	____	____________
Programming/Conversion Aid.	____	____	____________
Sort/Merge & Other Utilities.	____	____	____________
Data Management/Query/ Report Generator.	____	____	____________
Application Package.	____	____	____________
Other. (Describe)	____	____	____________

If yes, explain.

2e. What hardware does your software run on?

2f. How do hardware developments affect your software planning?

2g. How are priorities set for allocating resources; e.g. between new development and maintenance or between two different products?

Does this vary depending on the type of product?

	YES	NO
Operating Systems.	____	____
Compilers/Assemblers.	____	____
Communications.	____	____
Programming/Conversion Aids.	____	____
Sort/Merge & Other Utilities.	____	____
Data Management/Query/Report Generators.	____	____
Application Packages.	____	____
Other. (Describe)	____	____

If yes, describe.

2h. Once a decision has been made to develop a particular product, how is it determined which features and functions the product will contain? Who makes the final decision?

2i. Please explain the general organization structure for the product selection and definition process. Does it vary by type of product?

TITLE OF PERSON RESPONSIBLE	REPORTS TO (TITLE)	NO. OF LAYERS FROM PRESIDENT	NO. OF PEOPLE	MAJOR SUBFUNCTIONS

	YES	NO
Operating Systems.	____	____
Compilers/Assemblers.	____	____
Communications.	____	____
Programming/Conversion Aids.	____	____
Sort/Merge & Other Utilities.	____	____
Data Management/Query/Report Generators.	____	____
Application Packages.	____	____
Other. Describe.	____	____

If yes, describe.

2k. What is the single most important change in the product selection and definition process that you believe should be made? Do you think it is likely to be made? Please explain the reasons for and against.

III. PRODUCT DEVELOPMENT

3a. What kind of project management structure is used in your firm? (e.g., hierarchical, project groups, chief programmer teams, etc.)? (Do not prompt) Does it differ by the type of product?

	YES	NO	DESCRIBE
Operating Systems	____	____	____________
Compilers/Assemblers.	____	____	____________
Communications.	____	____	____________
Programming/Conversion Aids.	____	____	____________
Sort/Merge & Other Utilities.	____	____	____________
Data Management/Query/ Report Generators.	____	____	____________
Application Packages	____	____	____________
Other. (Describe)	____	____	____________

3b. Which productivity aids do you now use? (e.g., structured design, data dictionaries, programming preprocessors, automated testing, etc.)

3c. What type of project control and scheduling techniques do you use (e.g., PERT, manual control boards, etc)?

3d. What kind of performance measurements do you use to judge the effectiveness of the development process (e.g., lines of code, number of errors, etc.)?

3e. Please explain the general organization structure of the product development function.

TITLE OF PERSON RESPONSIBLE	REPORTS TO (TITLE)	NO. OF LAYERS FROM PRESIDENT	NO. OF PEOPLE	MAJOR SUBFUNCTIONS

3f. How many technical staff are allocated to major functional areas? (Avoid double counting)

FUNCTION	TECHNICAL STAFF (FTE)				
	PROGRAMMERS	ANALYSTS	PROGRAMMER/ ANALYSTS	OTHERS	TOTAL
New Development					
Enhancements					
Service/Maintenance Support					
Pre-Sale Marketing Support					
Post-Sale Installation Support					
Documentation					
Education					
Other					
TOTAL					

3g. What is the single most important change that you believe should be made in the product development process? Do you think it is likely to be made? Please explain the reasons for and against.

IV. MARKETING/DISTRIBUTION FUNCTION

4a. Please explain the general organization structure of your marketing and distribution organization.

TITLE OF PERSON RESPONSIBLE	REPORTS TO (TITLE)	NO. OF LAYERS FROM PRESIDENT	NO. OF PEOPLE	MAJOR SUBFUNCTIONS

4b. How many software products do you now offer, by type of product?

Operating Systems	____
Compilers/Assemblers	____
Programming/Conversion Aids	____
Sort Merge & Other Utilities	____
Data Management/Query/ Report Generators	____
Application Packages	____
Other. Describe.	____

4c. What marketing approaches do you use? Do they vary depending on the type of product?

	Advertising	Direct Mail	Sales Calls	Telephone Marketing	Seminars	Trade Shows	Other	Demon-strations
Operating Systems								
Compilers/Assemblers								
Communications.								
Programming/Conversion Aids								
Sort/Merge and Other Utilities								
Data Management/ Query/Report Generators								
Application Packages.								
Other (Describe)								

4d. What is the type or types of software sales/distribution used?

Direct sales to DP departments ____

Direct sales to end user departments ____

OEM systems houses ____

Hardware vendors ____

Systems integrators ____

Distributors/other third parties ____

Other. (Describe) ____

4e. Do you have your own salesforce for software products?

( ) YES ( ) NO

If no, go to question 4L.

4f. Do they sell other products as well?

Hardware ____

Turnkey systems ____

Timesharing ____

Consulting ____

Other. (Describe) ____

4g. How many salesmen are there? ________

4h. On the average, what percentage of your software salesman compensation is commission? ________%

4i. What is the revenue per salesman? $________

4j. Is the salesforce organized by:

Region _____
Industry _____
Application _____
Other. (Describe) _____

4k. Are there specialists in the salesforce by type of product?

	YES	NO
- Operating Systems	_____	_____
- Compilers/Assemblers	_____	_____
- Communications	_____	_____
- Programming/Conversion Aids	_____	_____
- Sort Merge & Other Utilities	_____	_____
- Data Management/Query/ Report Generators	_____	_____
- Application Packages	_____	_____
- Other. (Describe)	_____	_____

4L. Please explain the general organization structure of software service/maintenance, pre-sales and post-sales support.

FUNCTION	TITLE OF PERSON RESPONSIBLE	REPORTS TO (TITLE)	NO. OF LAYERS FROM PRESIDENT	NO. OF PEOPLE	MAJOR SUBFUNCTIONS
Service/ Maintenance					
Pre-Sales					
Post-Sales					

Do these people specialize by type of product or application? Explain.

4m. How are these marketing support functions coordinated with the marketing functions (e.g., direct line authority, task forces, assignment of individual staff, etc.)

4n. Who do you see as your chief competitors (generally, or for particular types of software).

SOFTWARE TYPE	COMPETITOR
Operating Systems	
Compilers/Assemblers	
Communications	
Programming/Conversion Aids	
Sort/Merge & Other Utilities	
Data Management/Query/ Report Generators	
Application Packages	
Other. (Describe)	

4o. What is the methodology used for pricing software? (unprompted)

Development cost plus profit _____
Value to customer _____
Price competitively _____
Other. (Describe). _____

4p. What percentage of your firm's revenues last year was attributable to software sales?

4q. What were your total revenues for your most recent year?

$__________million (19___)

4r. Could you send me a copy of your firm's most recent annual report and product literature?

( ) YES ( ) NO

4s. What is the most important change in the marketing and distribution process that you believe should be made? Do you think it is likely to be made? Please explain the reasons for and against.

V. TRENDS

5. In what directions do you think the software industry is going over the next 5 years and how will your firm respond?